

What Happens If..?

science experiments you can
do by yourself

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Pictures by **Daniel Nevins**

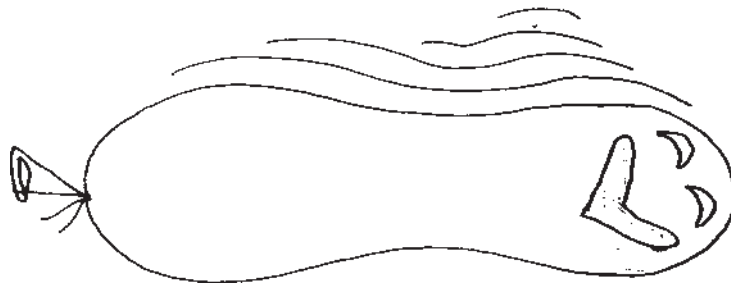


You know what happens
if you drop a ball.
It falls.

A round balloon, full of air,
is like a ball.
It falls too.



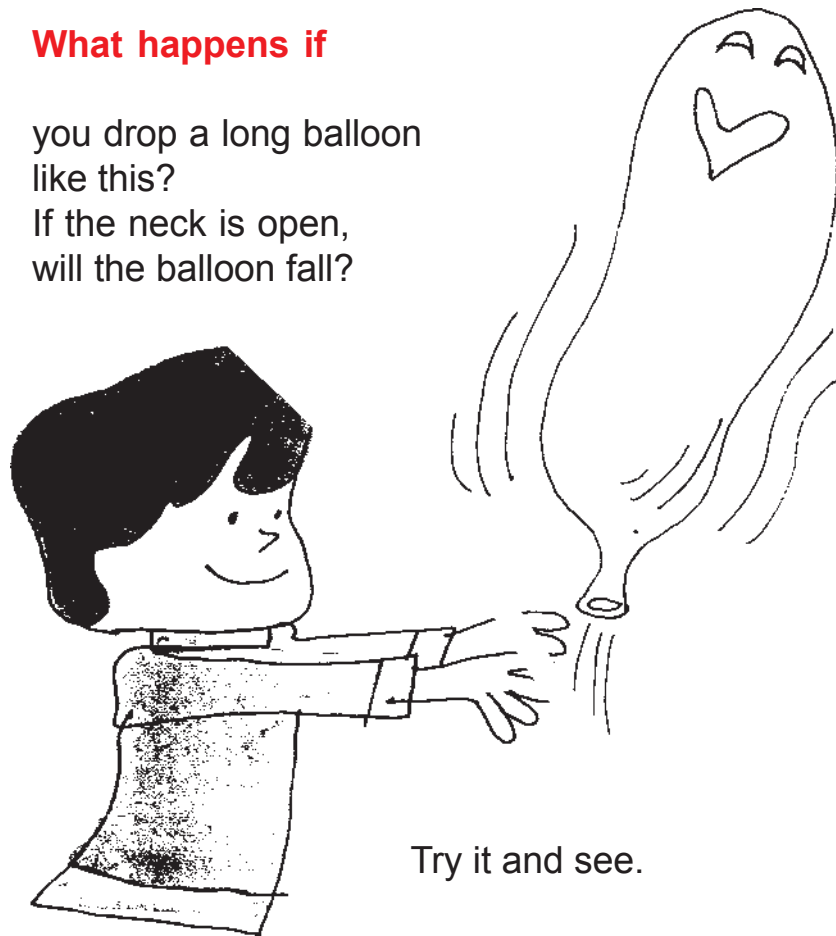
So does a long balloon that is full of air.



But...

What happens if

you drop a long balloon
like this?
If the neck is open,
will the balloon fall?

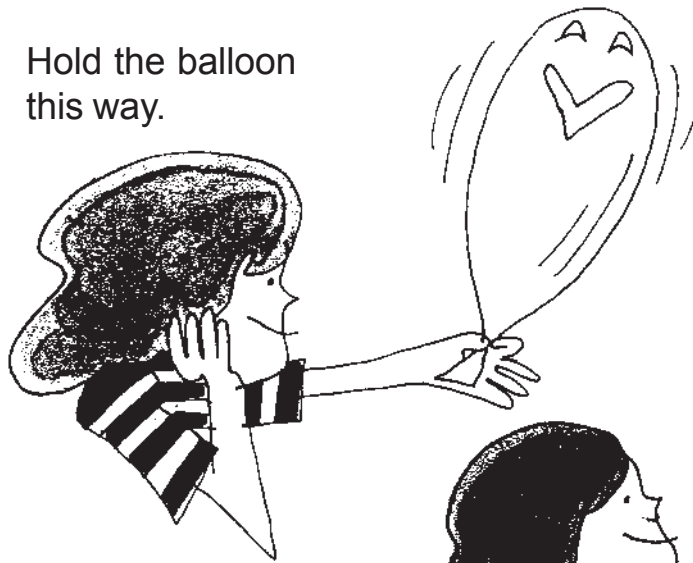


Try it and see.



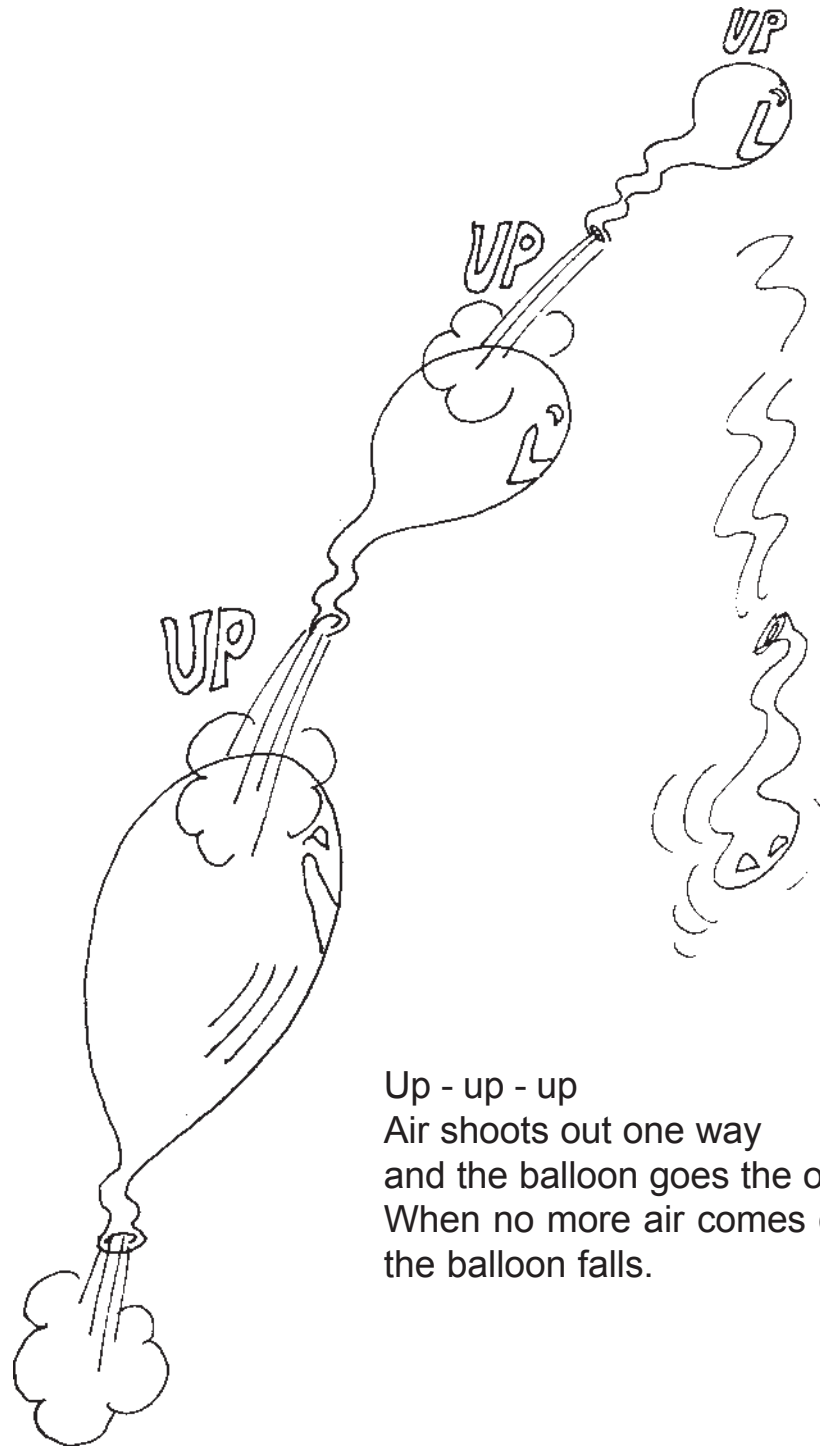
Blow up the balloon
as big as you can.

Hold the balloon
this way.



Now let it go.
The balloon zooms



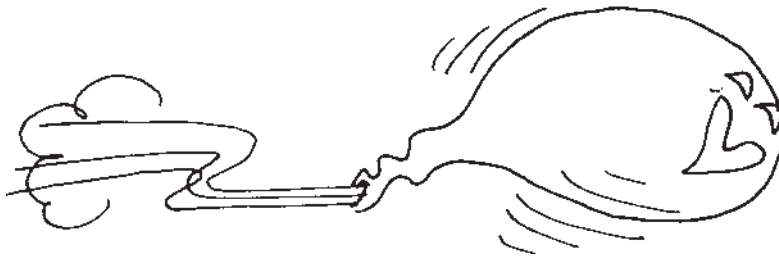


Up - up - up
Air shoots out one way
and the balloon goes the other way.
When no more air comes out
the balloon falls.

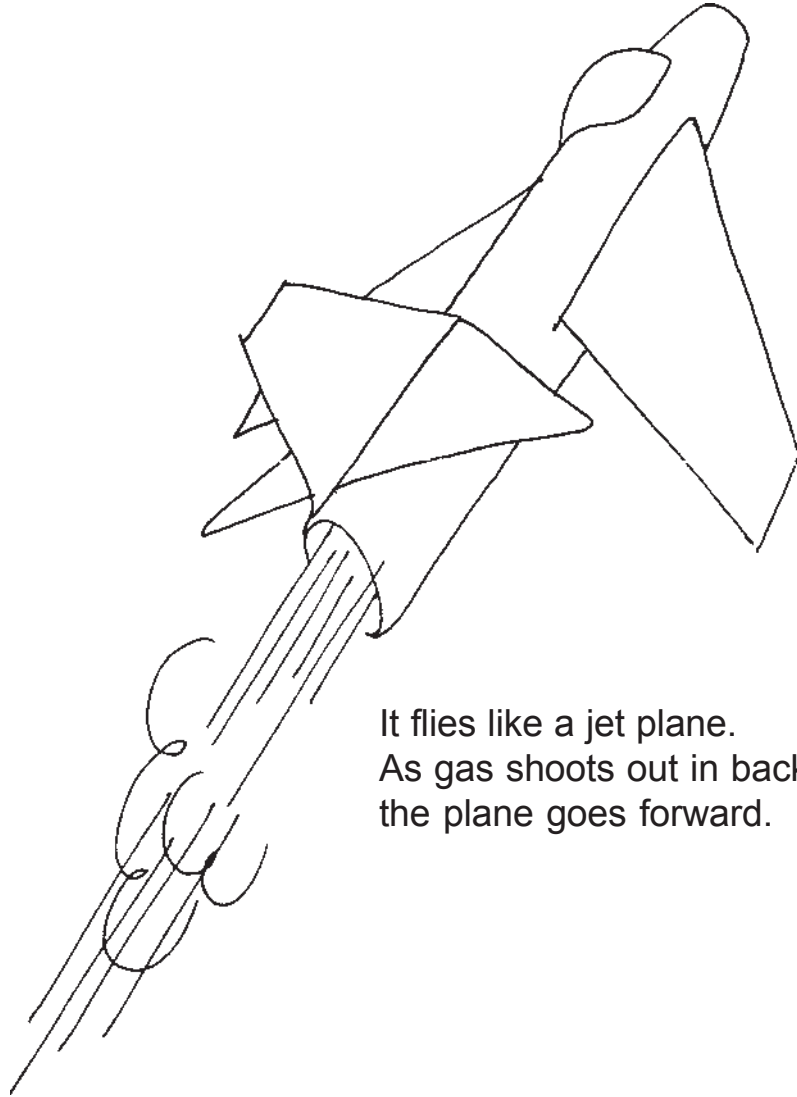
See what happens if
you hold the balloon like this,



then let it go.
Does it go up?

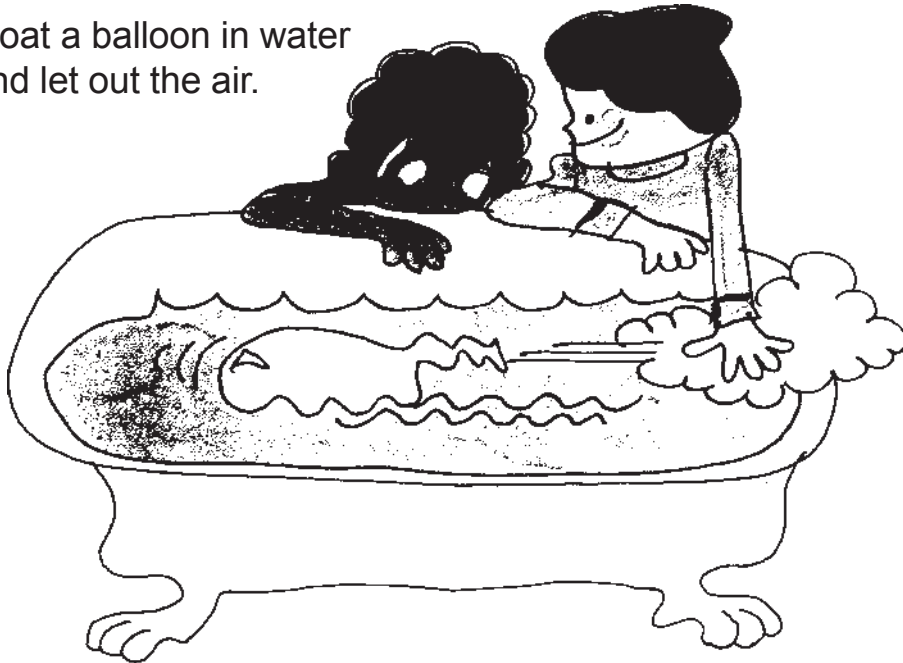


No!
Again the air shoots out one way
and the balloon goes the other way.



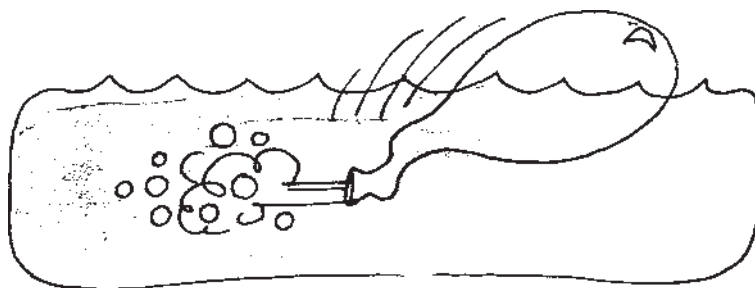
It flies like a jet plane.
As gas shoots out in back
the plane goes forward.

Float a balloon in water
and let out the air.



Now you have a boat—a fast jet boat. Air shoots out
one way and the boat goes the other way.

But what happens if the neck of the balloon is under water?
Will the air come out? Will the boat go?

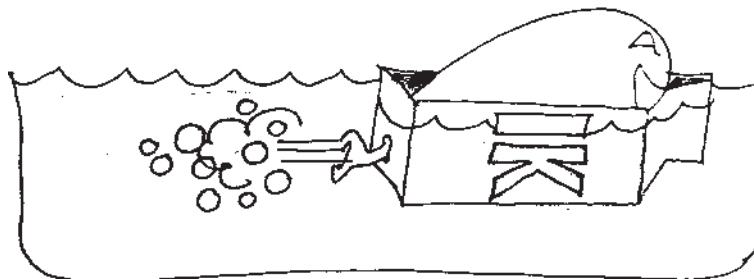
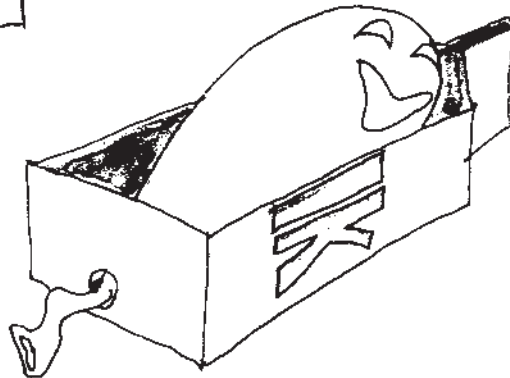


Try this experiment and see.



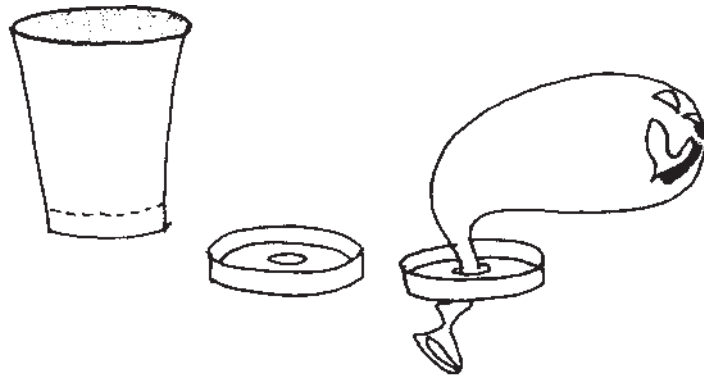
Try this too.
Take an empty milk carton.
Cut it in half.

Put a hole in the back.
Pull the neck of a balloon
through the hole.
Then blow up the balloon.



Float the boat and let it go.
Splash! The boat is fast.
But is it as fast as the others?
Does the carton slow it down?

You can make a fast jet boat this way too.
Take the bottom off a paper cup.
Then make a hole in it.
Pull the balloon through the hole.



Blow up the balloon and
the boat is ready to sail.



Make two jet boats and have a race. Use balloons
the same size. Put a small hole in the bottom of one
paper cup and a big hole in the bottom of another cup.

The air will come out faster from the boat
with the big hole. But will that boat go faster?

Ready now?
Get set—go!



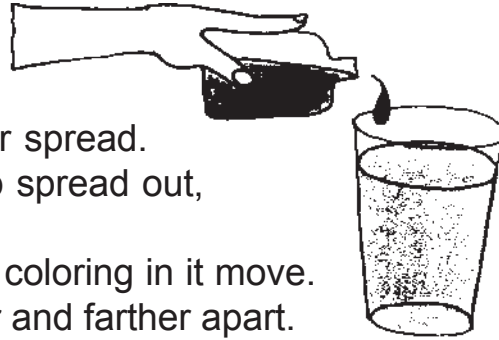
And hurray for the winner!

Sometimes scientists
mix things together
when they experiment.
You can do this too.

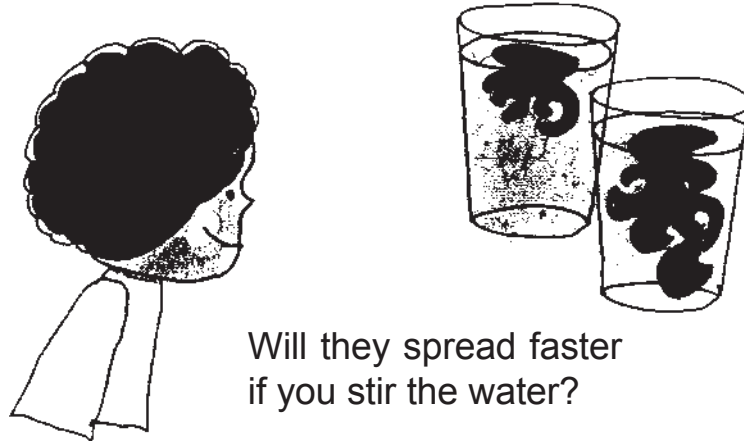


See
What happens if

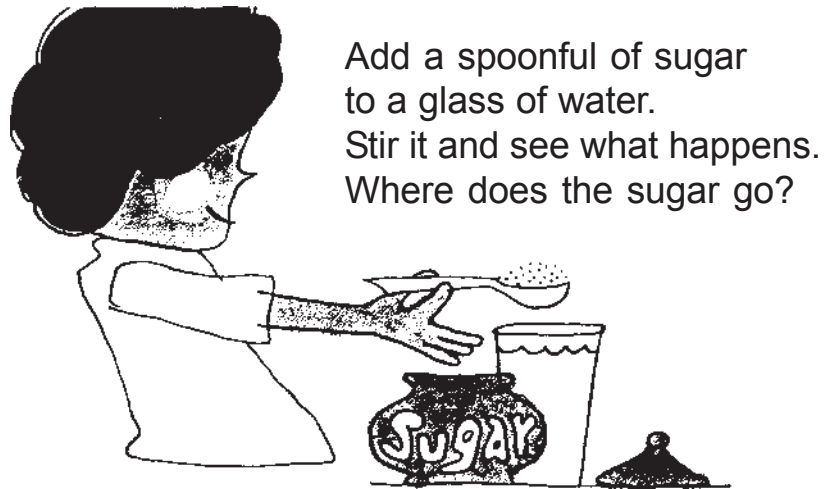
you put a drop of food coloring in a glass of water.



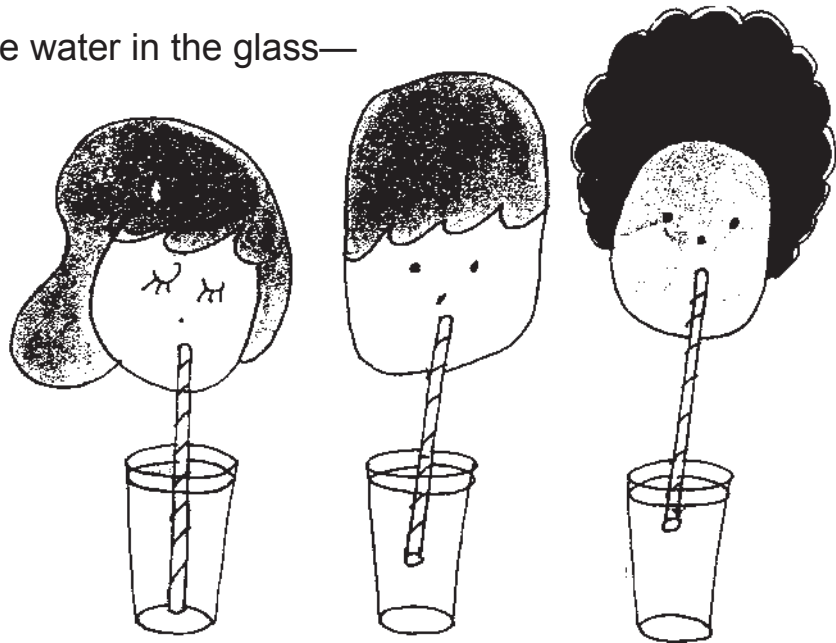
Watch the color spread.
Watch the drop spread out,
all by itself.
The tiny bits of coloring in it move.
They go farther and farther apart.



Will they spread faster
if you stir the water?



Taste the water in the glass—



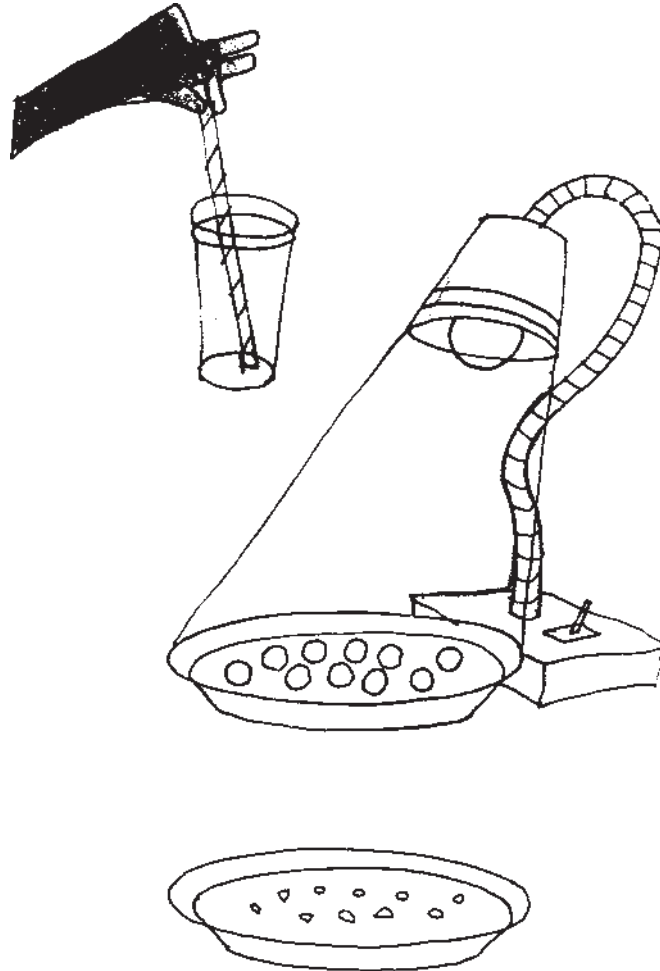
at the bottom

in the middle

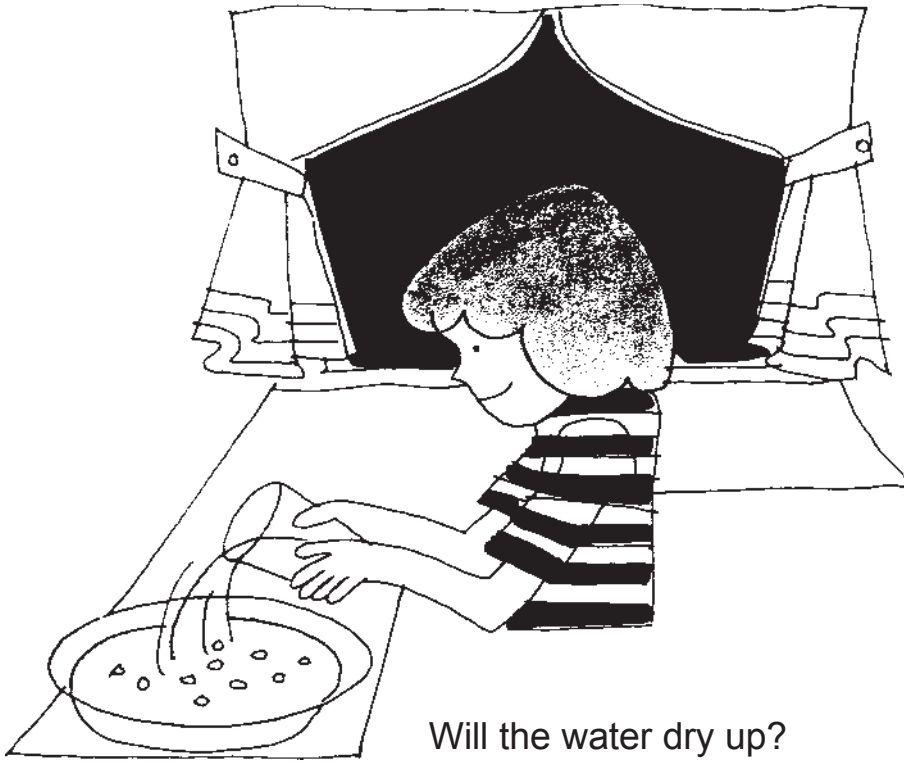
and on the top.

All of it tastes sweet. The sugar is still there
but in tiny bits too small to see.
The sugar has dissolved in the water.

Do you want to see the sugar again?
Put ten drops of sugar water on a clean pie plate.
Set the plate under a light.
After awhile the water dries up.
In place of the drops, there are spots –
ten white spots of sugar.



Pour the rest of the water
into the pie plate.
Set it in a warm place and
let it stay there overnight.



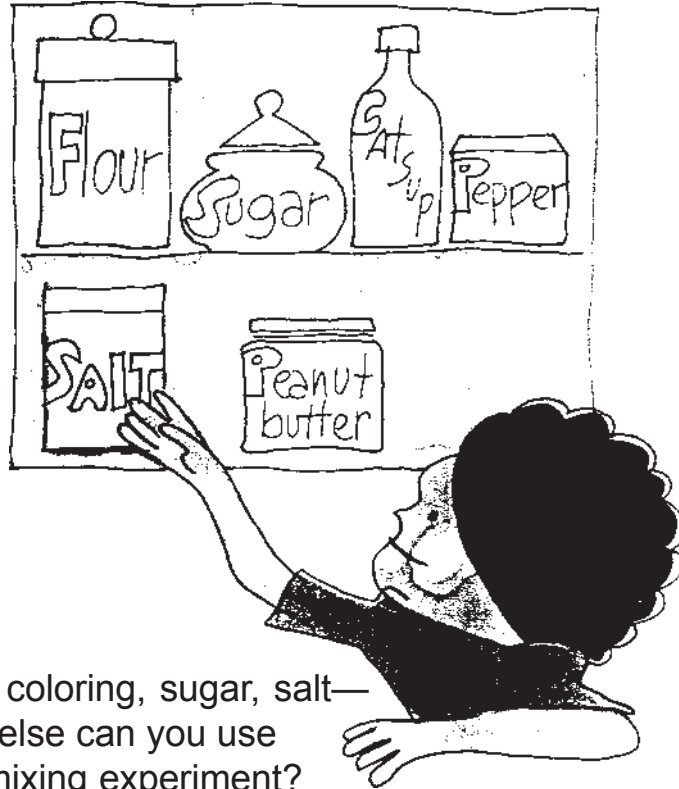
Will the water dry up?
Will the sugar show up again?

Try this too.

Add a spoonful of salt to a glass of water.

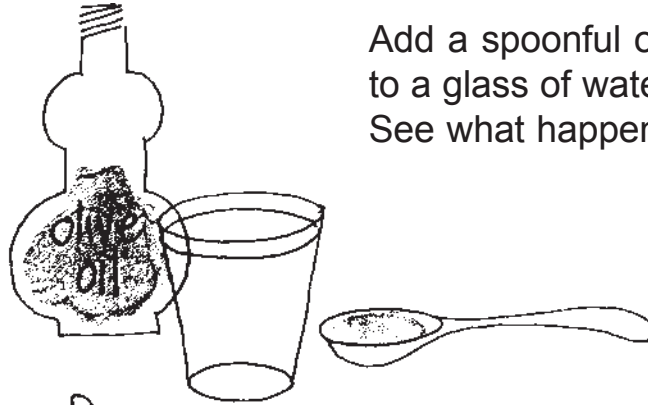
See if it dissolves.

Then see if you can make the salt show up again.

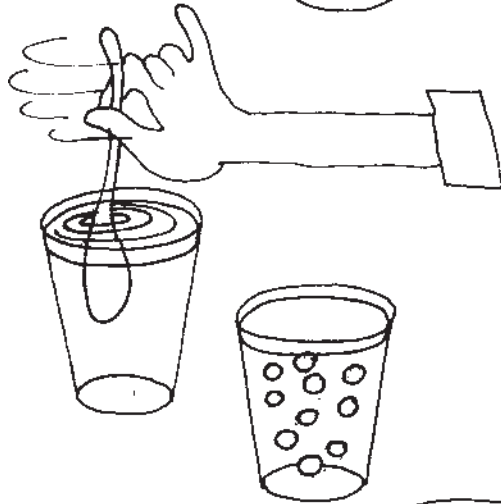


Food coloring, sugar, salt—
what else can you use
in a mixing experiment?

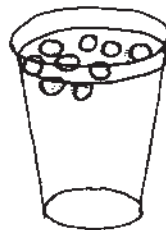
Add a spoonful of oil
to a glass of water.
See what happens.



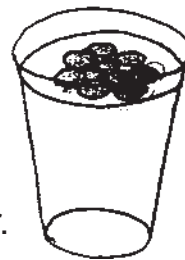
Stir the oil.
Watch it break
into little drops.



Stop stirring
and the drops rise.
Push them down
and they rise again.



One after another
the drops come together
and spread over the top of the water.



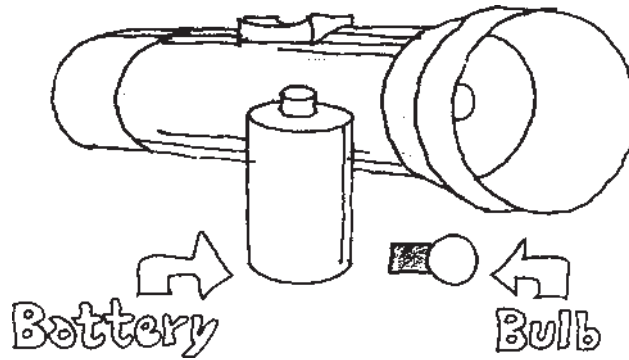
The oil does not mix or dissolve in the water. It stays on top.



Is something wrong with the experiment?
No. The experiment works.
It shows what happens
if you put oil into water.

Do you like to find out
how things work?

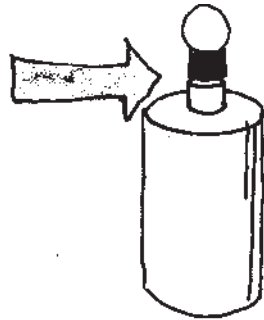
Then try these
flashlight experiments.



Start with two things—
a good flashlight battery and
a good flashlight bulb.

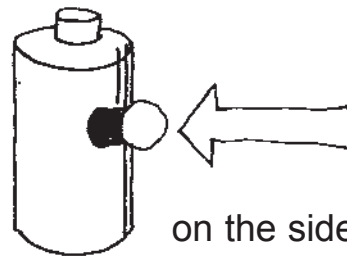
See
What happens if

you hold a bulb on a battery.



Hold the bulb
on the top
of the battery

on the bottom.



on the side

Does the light go on?

No.

You cannot get electricity
from the battery with just a bulb.

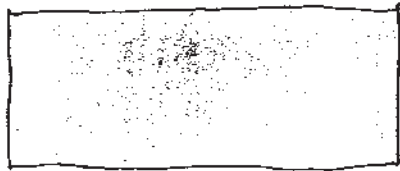
What else do you need?



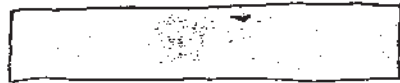
Try a metal strip.
You can make one
from aluminum foil.

Fold a piece of foil.

Fold it again



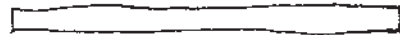
and again



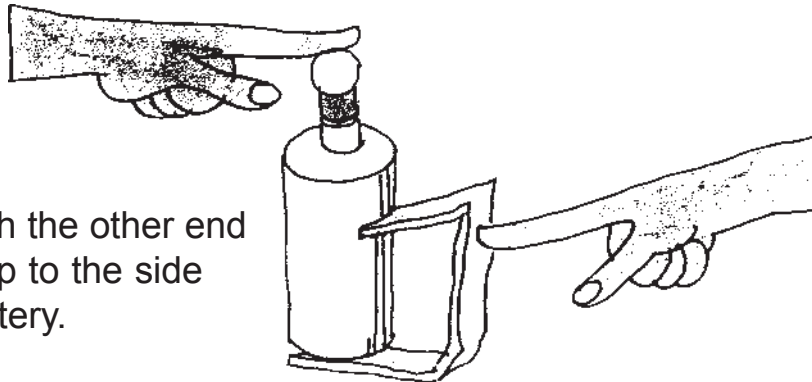
and again



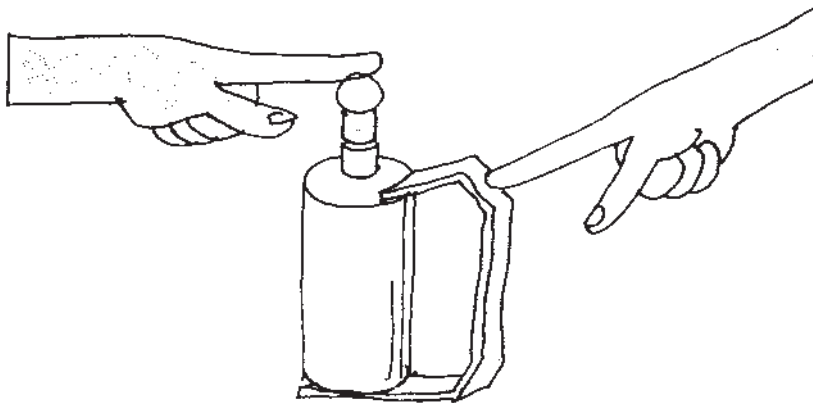
until you make a thin strip.



Stand the battery on one end of the strip and hold the bulb on the battery knob.

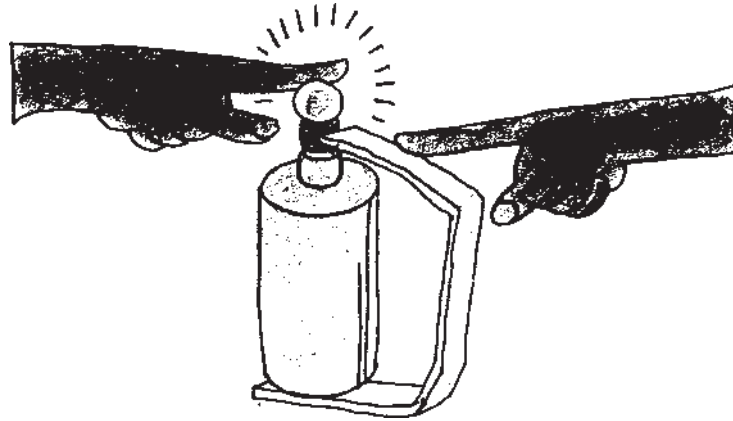


Now touch the other end of the strip to the side of the battery.



Try it on top of the battery too.
Does the light go on?
No. But don't give up!

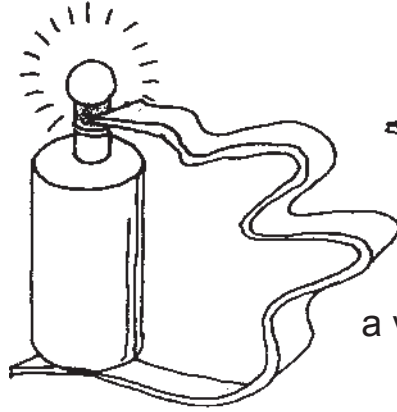
Put the end of the strip
on the metal of the bulb
and flash –



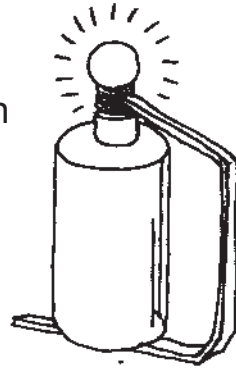
the light goes on!

The metal knob,
the metal of the bulb,
the metal strip and
the metal bottom of the battery
are all connected.
Now electricity can flow from
the battery to the bulb.

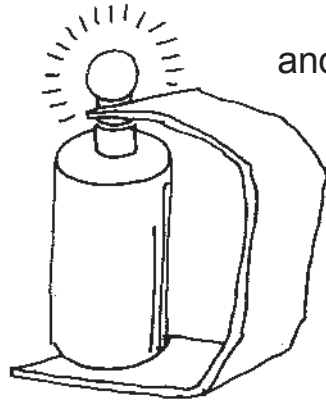
Experiment with
a very thin strip



a very long strip



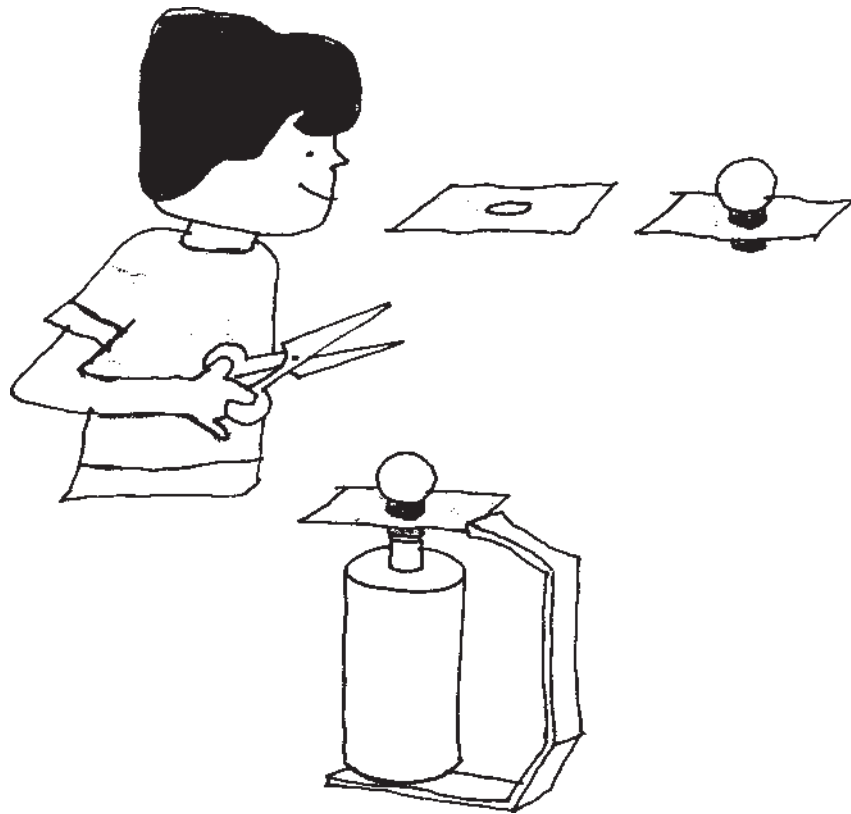
and a very wide strip of foil.



Can you make the light go on?

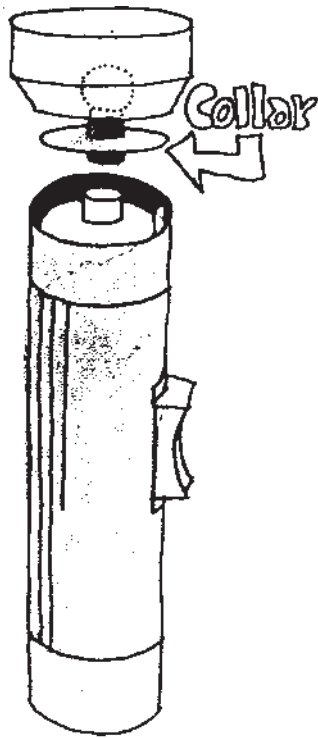
Try a metal collar around the bulb.
This is how to make one.

Use a piece of foil.
Put a small hole in it and
fit the bulb through the hole.

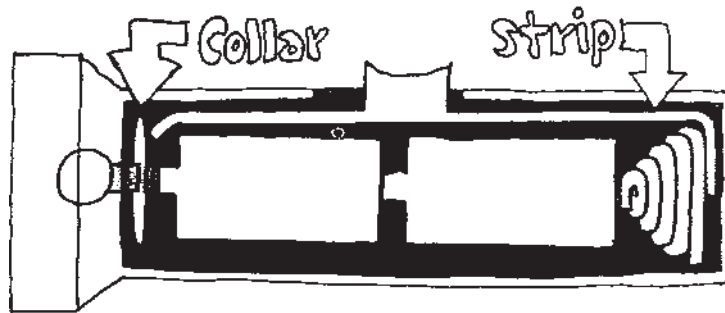
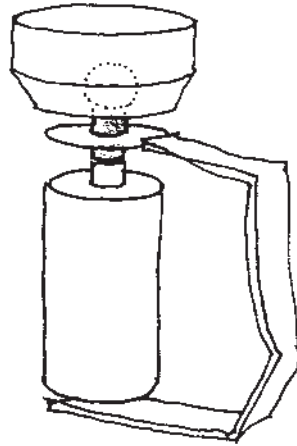


Now connect a strip of foil
to the collar this way.

Does the light go on?

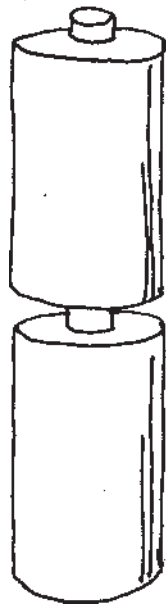


Every flashlight has a metal collar inside.
To find it, take the top off a flash light. Now hold the top on the battery knob and connect the strip to the collar this way. Does the light go on?



Every flashlight has a metal strip inside too.
The strip is along one side.
Push up the button on the outside and the strip moves up. If the flashlight is closed. when the strip moves up, it hits the collar.
This makes the light go on.

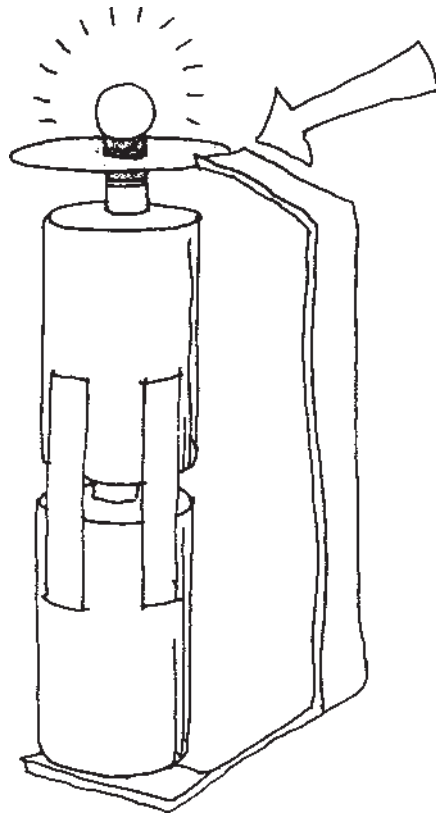
Two batteries
are better than one.
They give
a brighter light.
See for yourself.



Put one battery
on top of another one
like this.

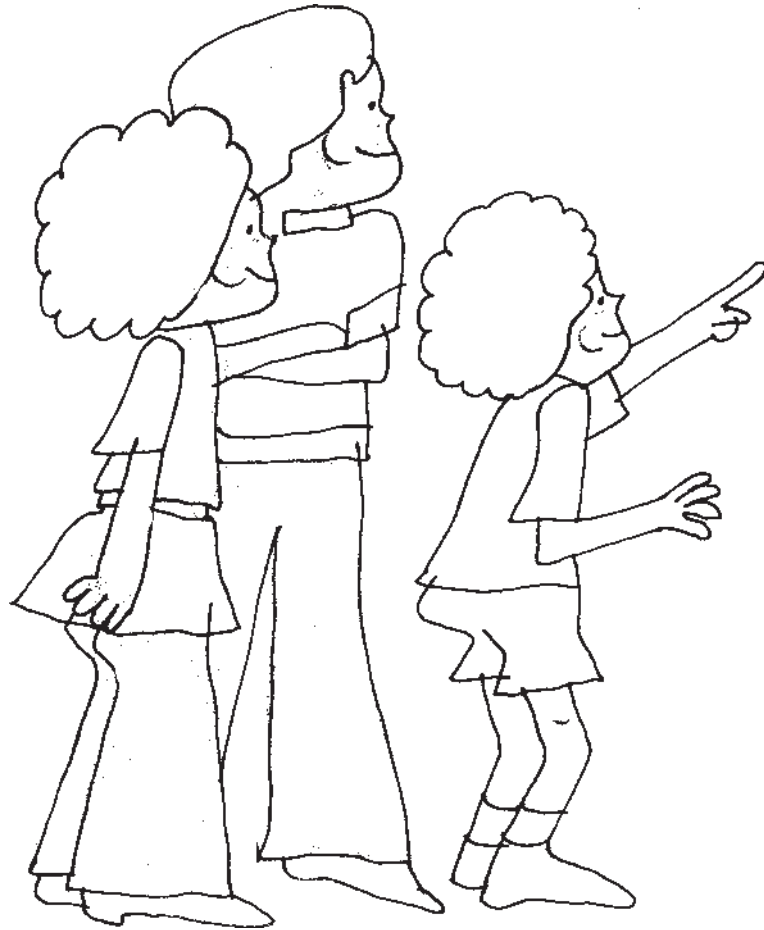


Now tape the two batteries together with sticky tape.



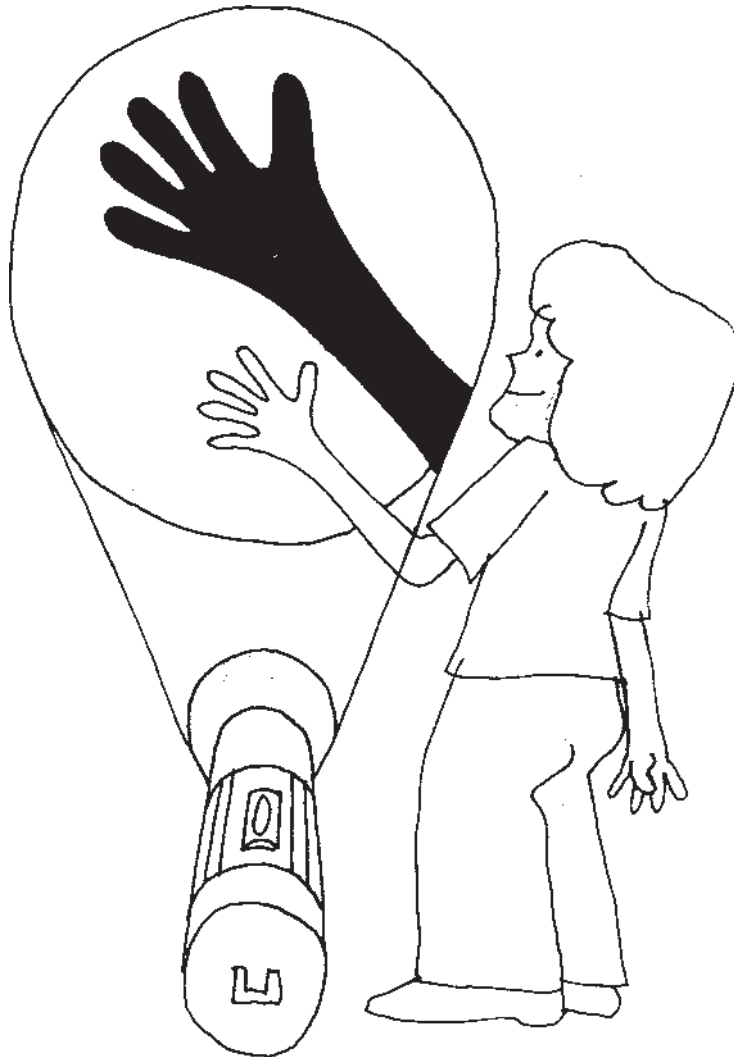
Take a long strip of foil and stand the batteries on one end. Hold the bulb and collar on the knob of the top battery. Make the strip hit the collar and the light goes on. How bright it is! You have made a two-battery flash light.

Before you put the flashlight away,
try some shadow pictures.
Go into a dark room.
Stand as far from the wall as you can.
Now light the flashlight.

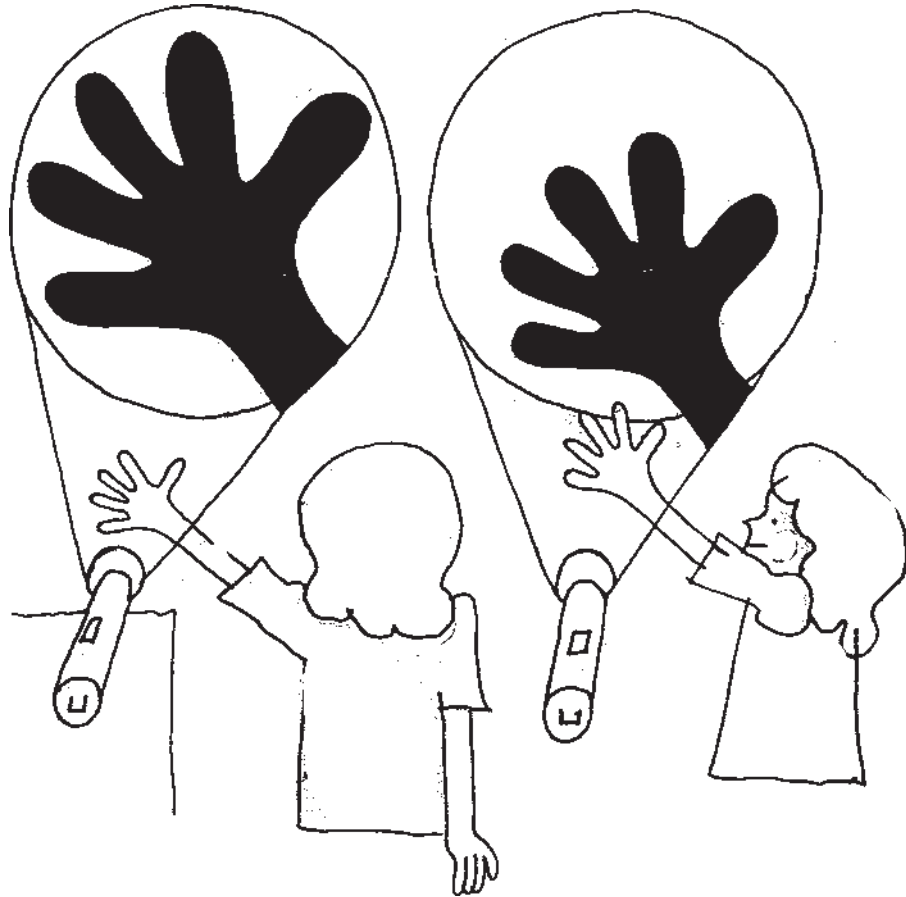


What happens if
you hold your hand in front of the light?

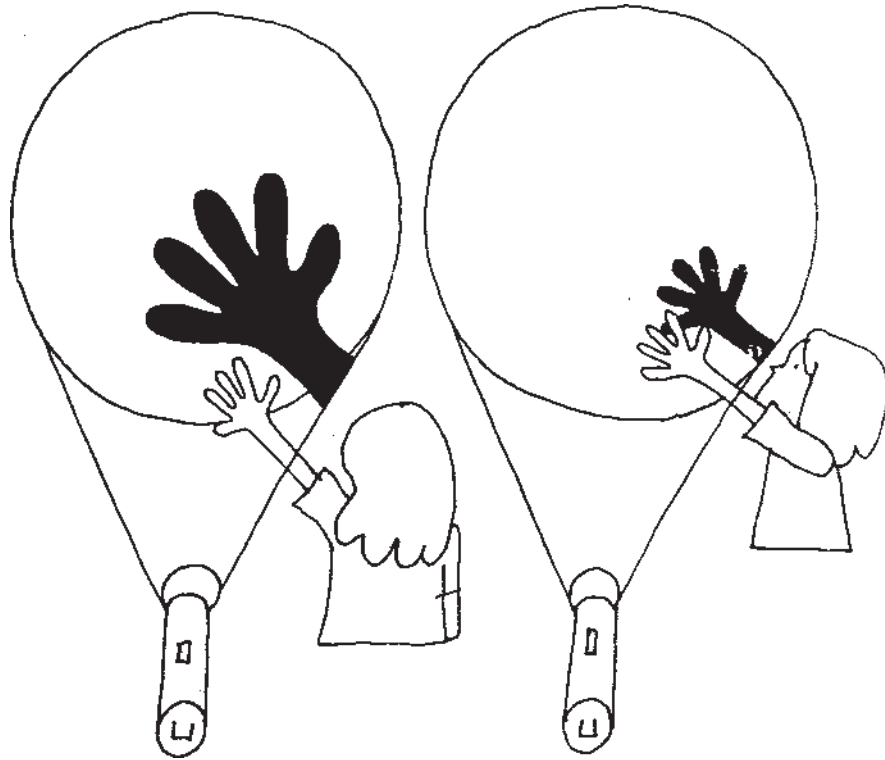
Your hand cuts off some of the light
and part of the wall turns dark.
The dark part is a shadow —
a shadow of your hand.
How big it is!



Put the flashlight on a table.
Hold your hand in front of the light
and walk to the wall.
What happens to the shadow?
Does it stay the same size?

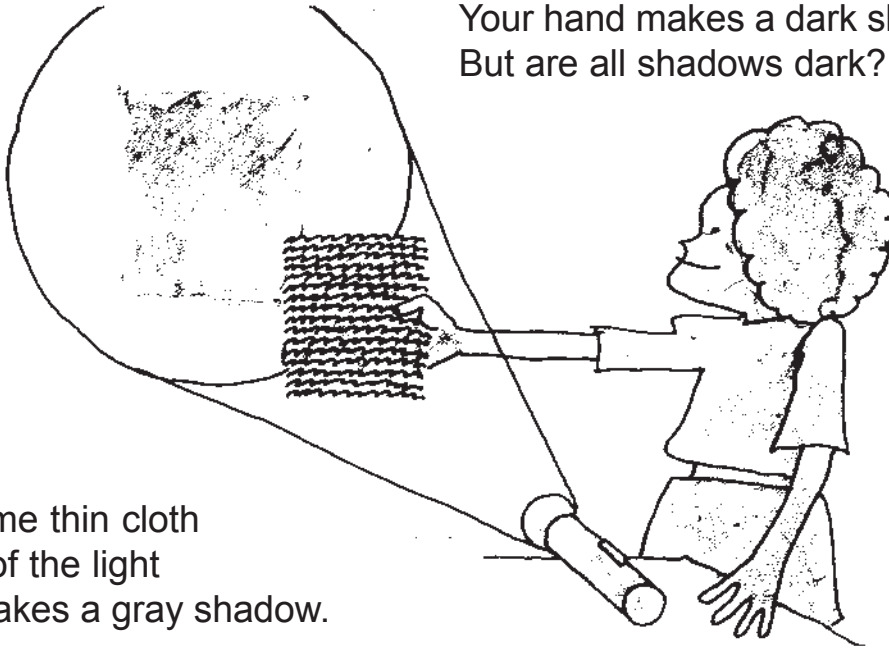


At first the shadow is big. Your hand is near
the flashlight and blocks a lot of light.



As you walk to the wall, your hand blocks less and less light. The shadow gets smaller and smaller. When your hand is near the wall, it is smallest of all.

Your hand makes a dark shadow.
But are all shadows dark?



Hold some thin cloth
In front of the light
and it makes a gray shadow.

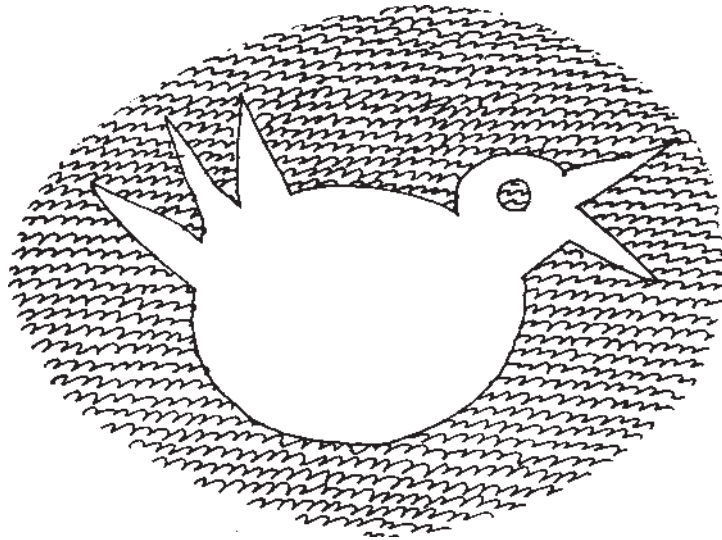


Look through the cloth and
you see why the shadow is gray.

Some light goes
through the cloth.

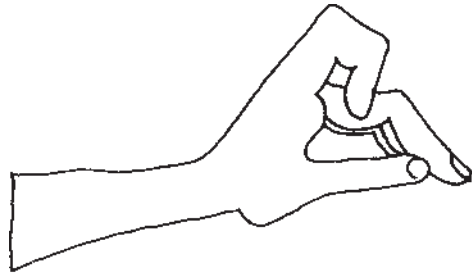
Experiment with other things.
See if light goes through them.
Then see if they make
dark shadows or light shadows.

Try this too.
Cut a piece of thin cloth
into the shape of an egg.
Then cut out a paper chick.
Paste it on the cloth.
Hold the cloth near the wall
and you will get a shadow picture
of a chick inside an egg.



Try making other shadow pictures.

To make a duck,
hold your hand this way:

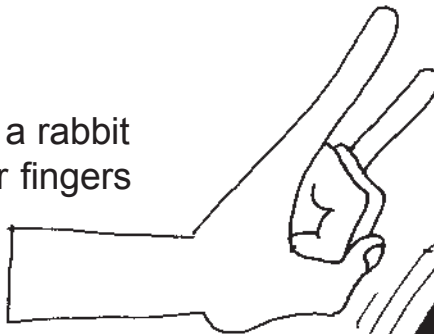


Make your
fingers go
up and
down.



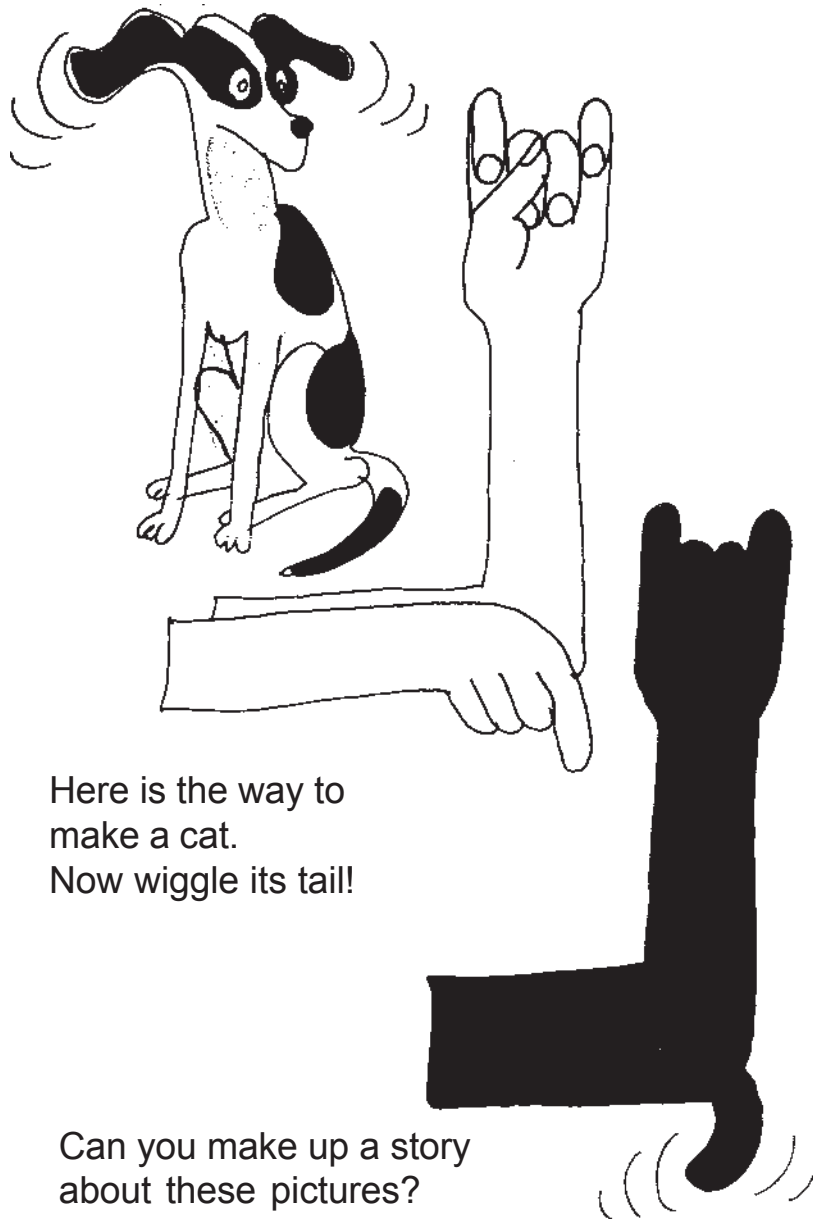
The duck will talk.

To make a rabbit
hold your fingers
this way:



Wiggle its ears!





Here is the way to
make a cat.
Now wiggle its tail!

Can you make up a story
about these pictures?
Ask your friends to help you.
Then put on a shadow show.

Do you like playing with ice cubes?
Then try these experiments.

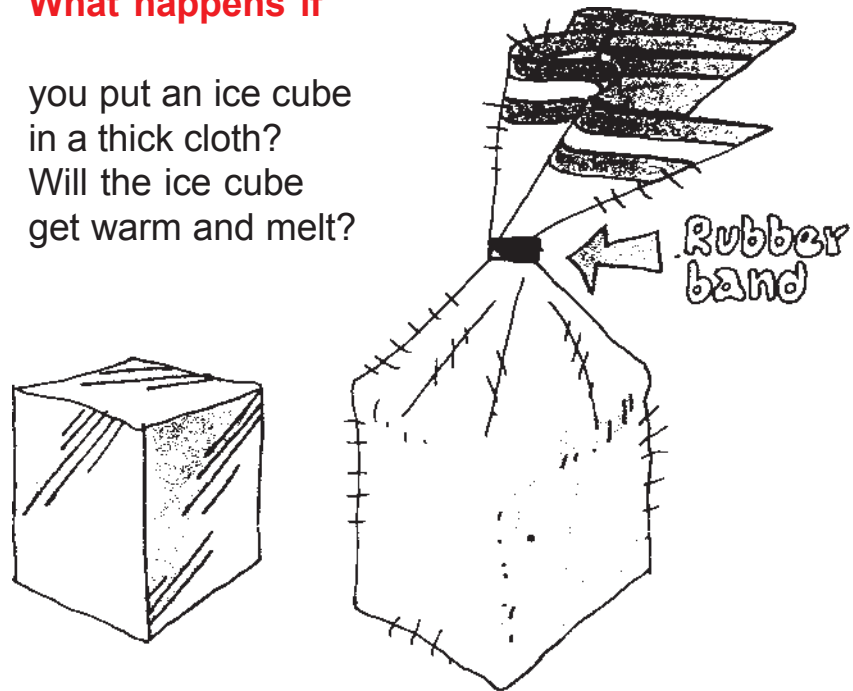
You know what happens
if you put on a coat.
You will be warm.



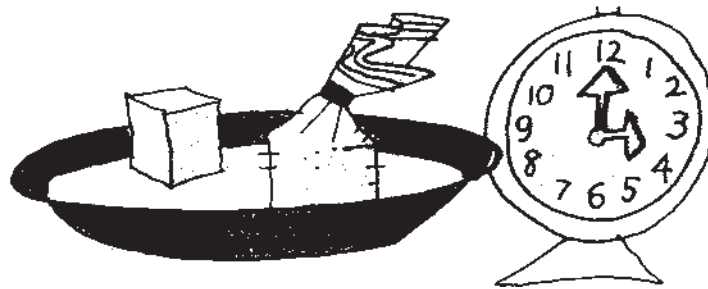
But -

What happens if

you put an ice cube
in a thick cloth?
Will the ice cube
get warm and melt?

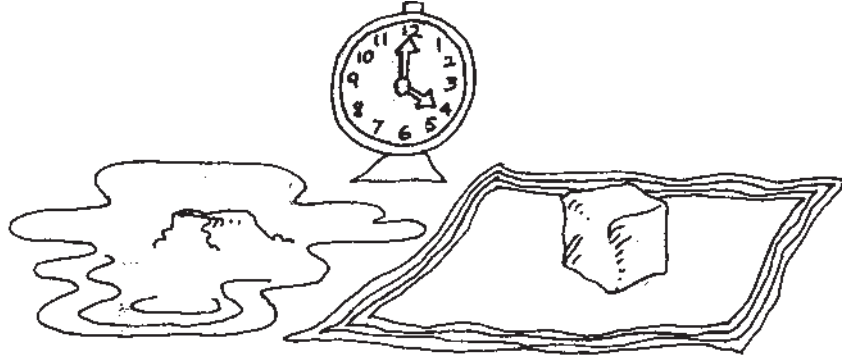


Take two ice cubes the same size. Wrap one in a washcloth and put a rubber band around it. Do not wrap the other one.

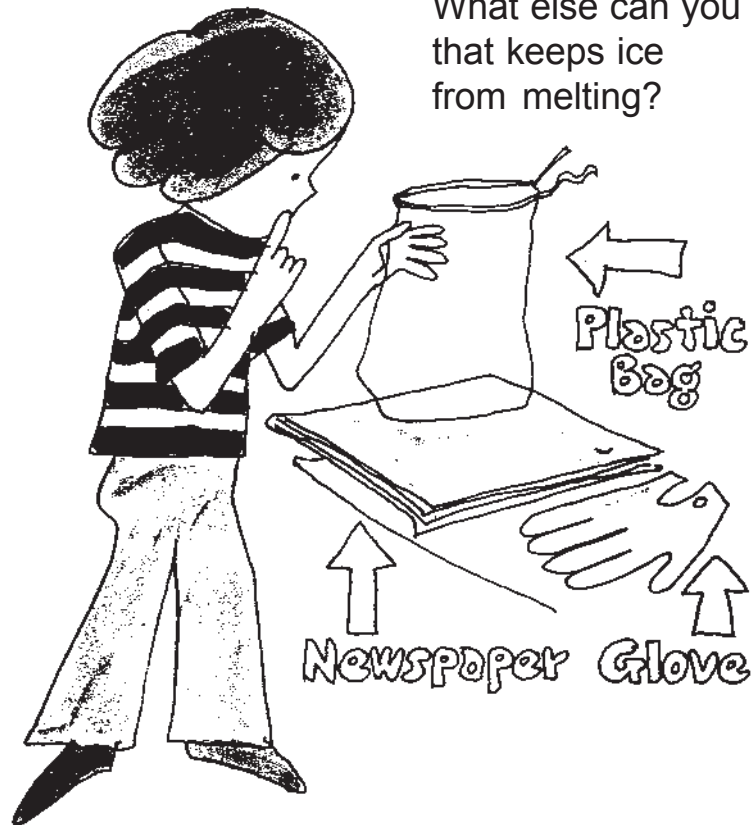


Put both ice cubes on a plate.
Keep them in a warm place for awhile.
See which cube melts first.

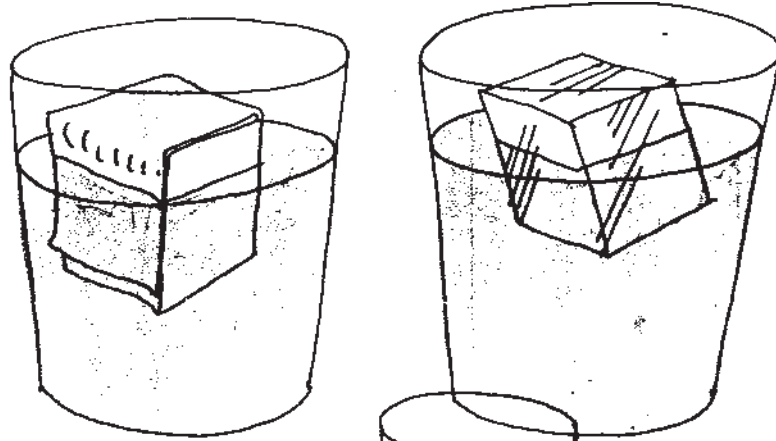
Does the cube without a wrap melt first? Warm air gets at that cube but it cannot get at the other one. The thick cloth keeps out the warm air and keeps the ice cube from melting.



What else can you find that keeps ice from melting?



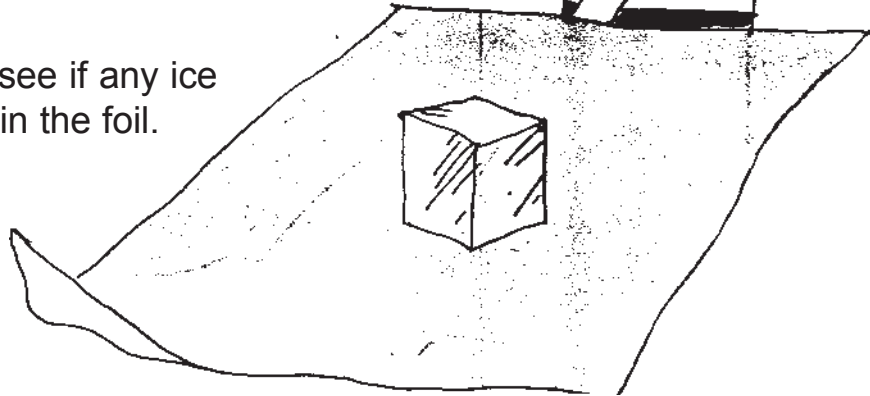
Try aluminum foil.
Take two ice cubes, the same size,
and wrap one in foil.
Put each cube in a glass of warm water.

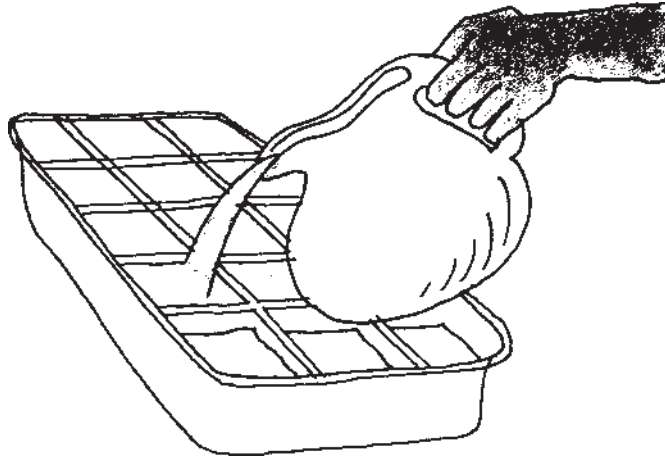


Watch the cube
without a wrap
melt away.



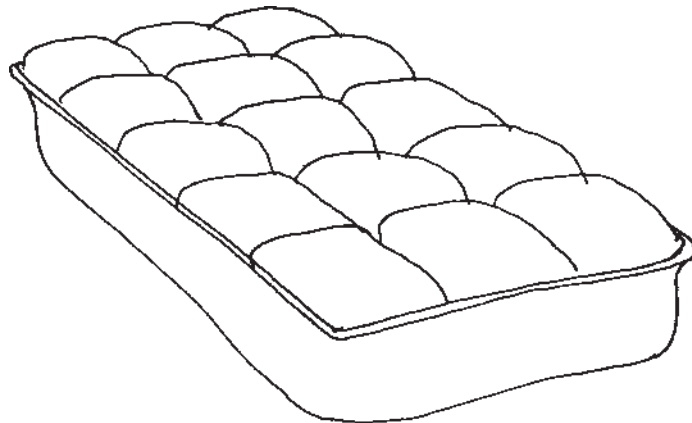
Then see if any
ice is left in the foil.



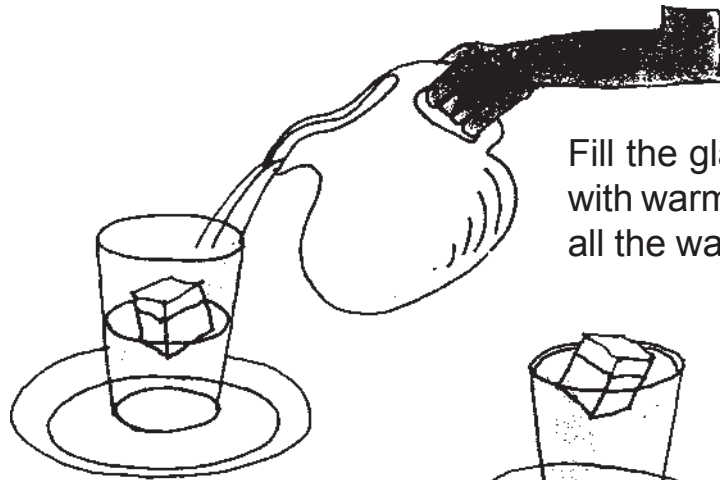


Try this too.

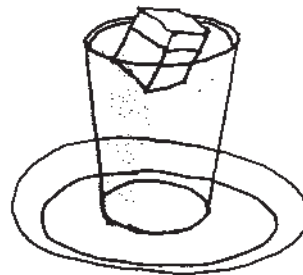
Fill an ice cube tray with water
all the way to the top.
Freeze the water.
Then look at the cubes.
You will find each one
goes over the top of the tray.
Each cube takes up more space
than the water it is made of.



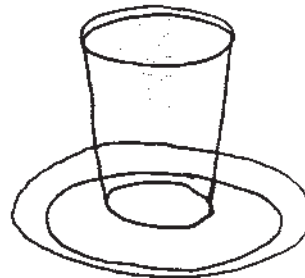
Now try this experiment.
Put an ice cube in a glass
and stand the glass on a plate.



Fill the glass
with warm water
all the way to the top.



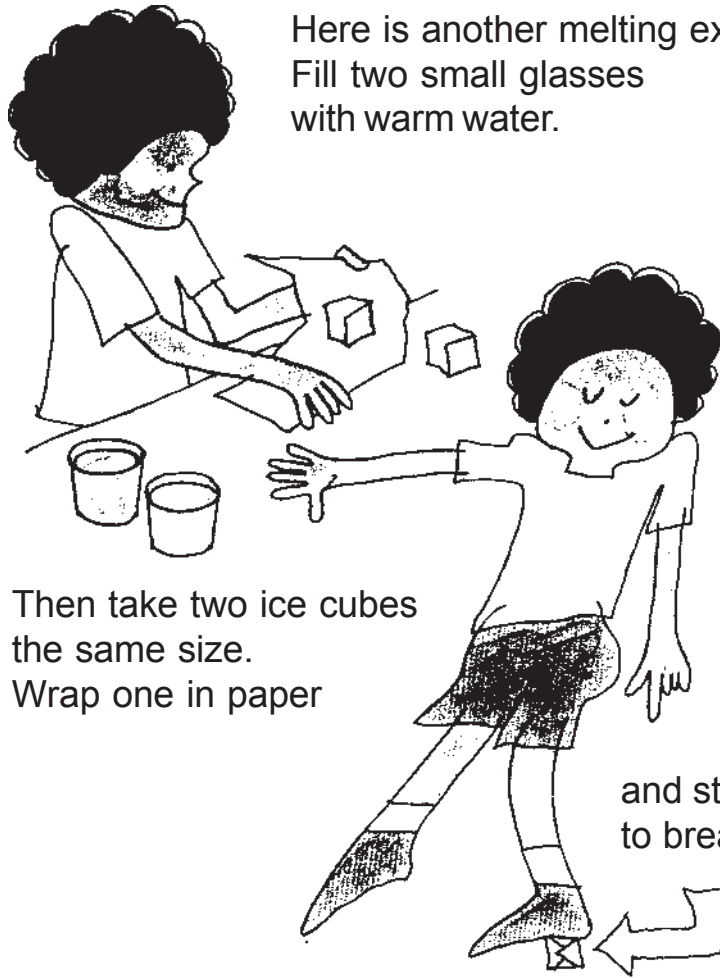
When the ice cube floats,
part of it sticks out of the water.



But when the ice melts,
does water spill into the plate?
No. The plate stays dry.

All the water from the cube went into the glass.
It fit because the ice cube took up more space
than the water it was made of.

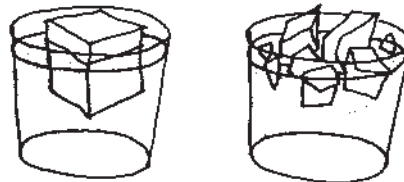
Here is another melting experiment.
Fill two small glasses
with warm water.



Then take two ice cubes
the same size.
Wrap one in paper

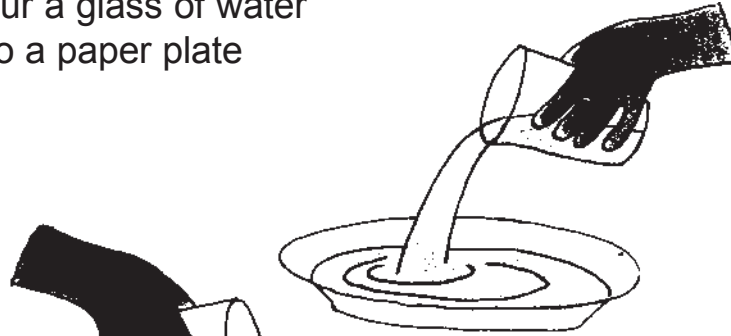
and stand on it
to break the ice.

Put the pieces of ice in one glass
and the ice cube in the other glass.
See which melts first.



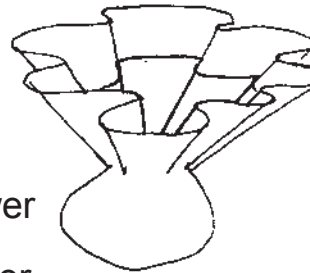
Each little piece of ice has warm water around it.
Together the pieces have more warm water
around them than the cube.
That is why they melt faster.

Experiment with ice in different shapes.
Pour a glass of water
into a paper plate

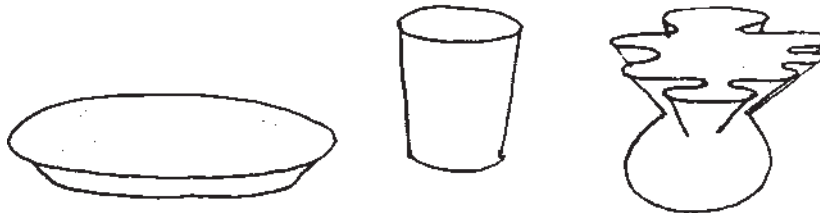


into a paper cup

and into a thick
piece of foil
shaped like a flower



Freeze the water.



Then take off the paper and foil. Put the ice in a warm place.
See if the shape with the most air around it melts first.

Will the same things happen
if you do these experiments again?
Do them in the same way and
you will really know

What happens if...



End