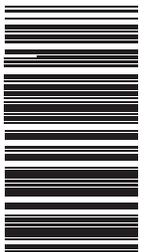


Volume 1
Number 2

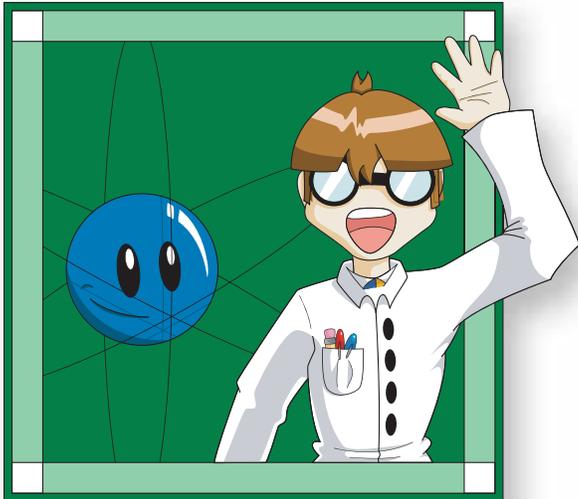
OPERATION CLEAN DESERT



ACTIVITY BOOK



Operation Clean Desert



Dr. Proton and Adam the Atom

Hi Kids!

Are you ready for some fun? You're about to take off on a radical, wind surfing, time machine adventure and learn about Operation Clean Desert!

This fun book is full of cool games, puzzles, and activities that follow the adventures of Dr. Proton and Adam the Atom as they learn about the Nevada Test Site. The story and games inside will teach you about different things that can affect our environment such as contaminated groundwater and waste disposal.

And, guess what else? Dr. Proton and Adam can continue the adventure at your school or afterschool youth program. Their goal is to help you, your friends and classmates learn about the environment at the Nevada Test Site and what is being done to clean it up.

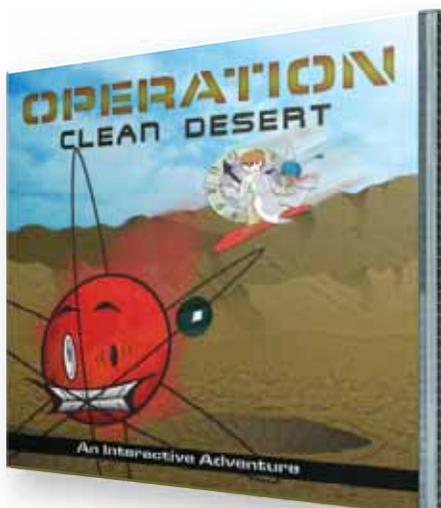
Just tell your teachers or youth program director that there are lots of cool activities and an exhibit that you can have right in your classroom or meeting place.

You'll have loads of fun exploring an interactive exhibit that you can actually touch, or test your knowledge playing a computer game that takes players through a series of mini-challenges.

Send an e-mail to envmgt@nv.doe.gov to learn more. Dr. Proton and Adam the Atom look forward to seeing you soon!



3-D Exhibit



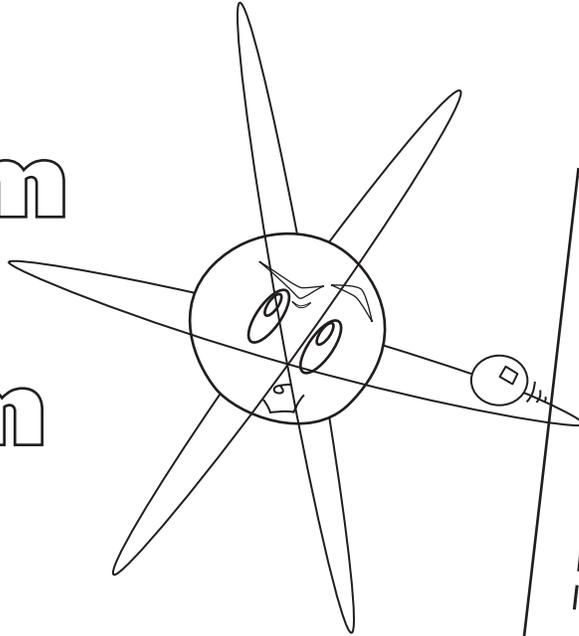
Video Game

Questions, Comments, Suggestions?

Your feedback is important to us! If you have questions, comments, or would like additional information on the Operation Clean Desert game, workbook, or display, please contact the Nevada Site Office at (702) 295-3521 or e-mail envmgt@nv.doe.gov.

Starring:

Adam
the
Atom



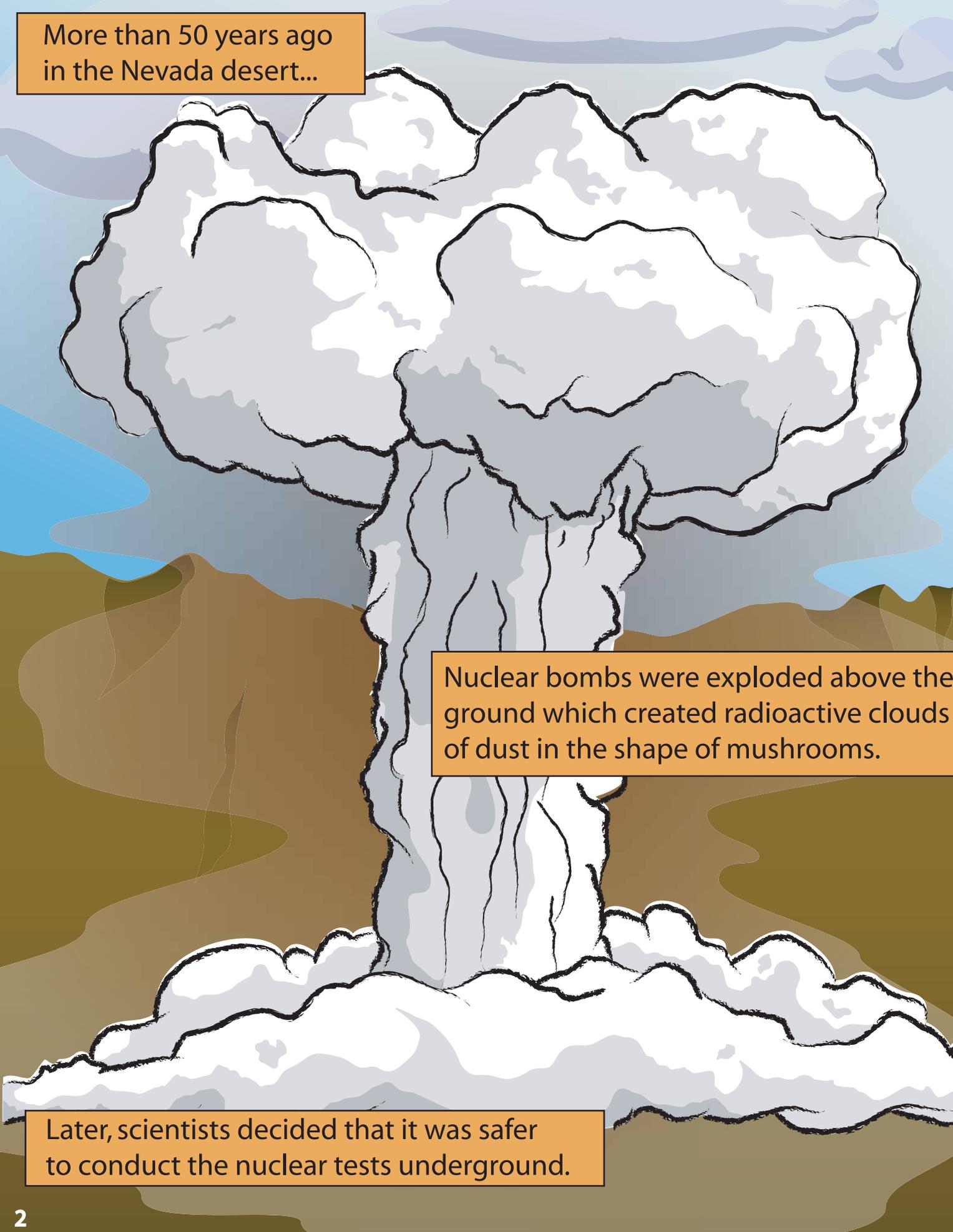
Adam is a very large atom. A regular atom is so small that it cannot be seen without using a special microscope. Plants, people and even the air we breathe are made up of atoms. Adam the Atom is very curious and likes to ask his friend, Doctor Proton, lots of questions.

Doctor
Proton



Doctor Proton is a scientist who, along with his buddy Adam, travels through time to explore ways in which people have changed the environment. Their newest adventure takes them to the Nevada Test Site...

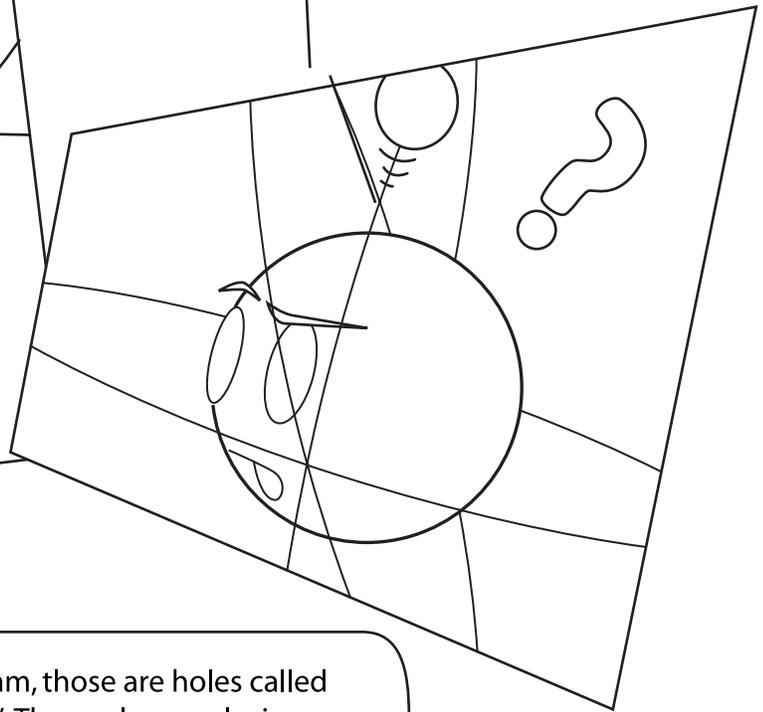
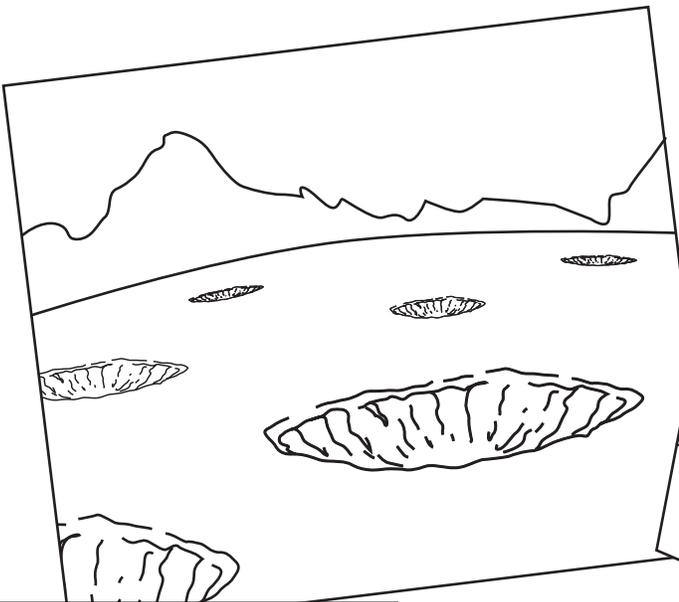
More than 50 years ago
in the Nevada desert...



Nuclear bombs were exploded above the
ground which created radioactive clouds
of dust in the shape of mushrooms.

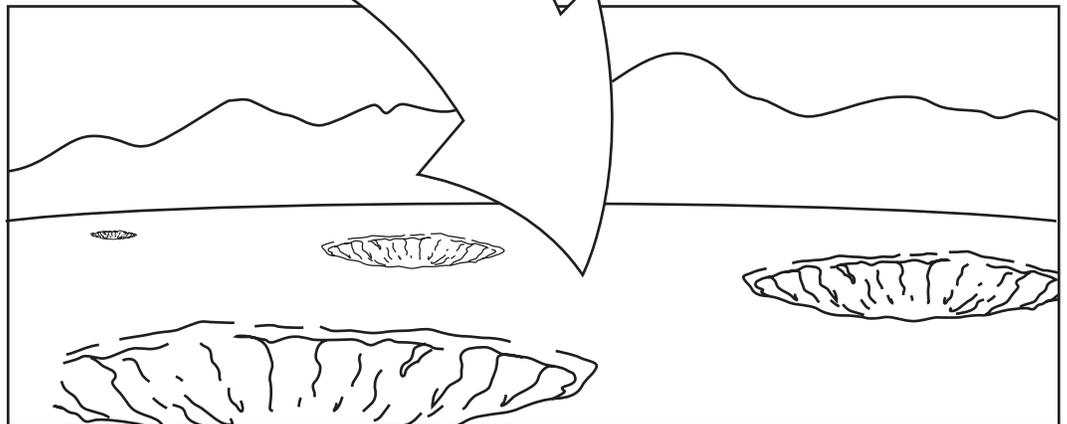
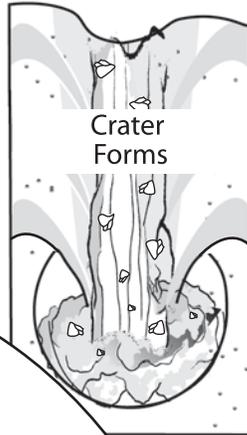
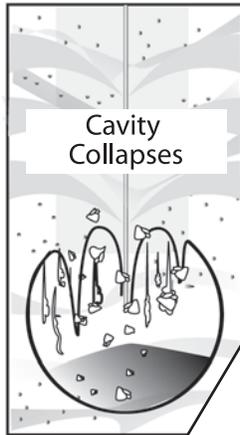
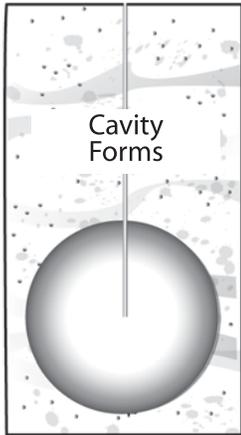
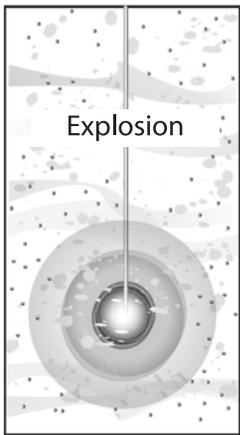
Later, scientists decided that it was safer
to conduct the nuclear tests underground.

Doctor, what are these holes in the ground?



Well Adam, those are holes called "craters." The nuclear explosions beneath the ground created cavities, like the holes you get in your teeth when you do not brush.

The surface dirt collapsed in to fill the cavities forming craters.

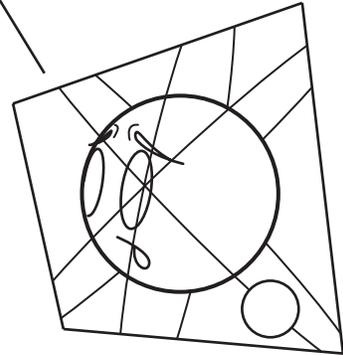


Color this page.



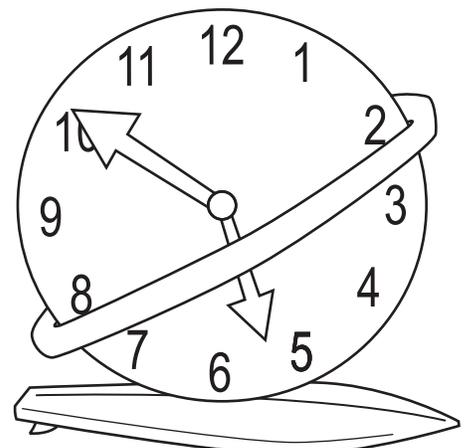
From 1951 - 1992 scientists conducted 100 above ground and 828 underground nuclear tests at the Nevada Test Site.

But Doctor, did the nuclear tests hurt the land?



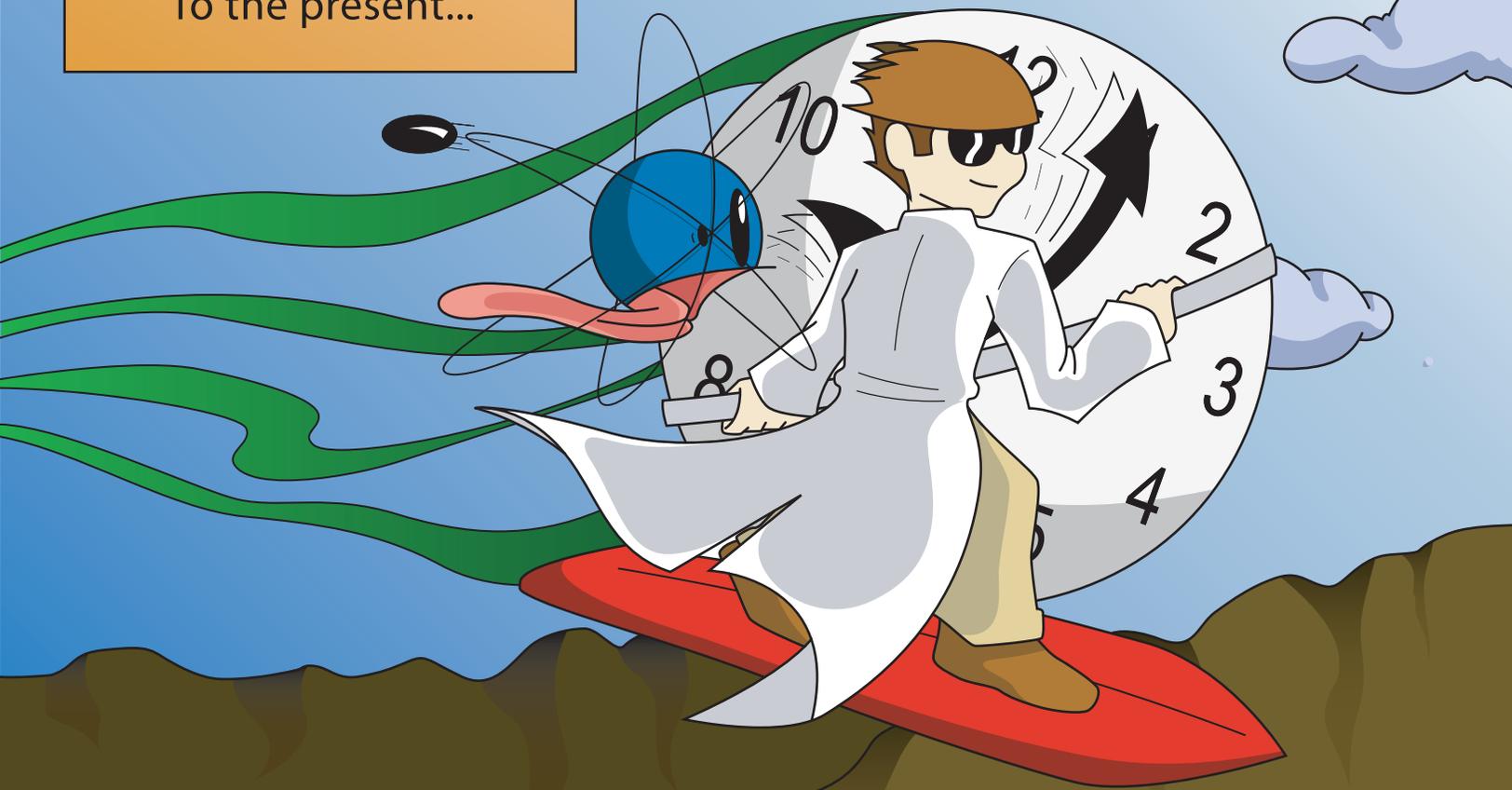
Yes, Adam. The nuclear testing and other projects damaged the environment. But today, scientists and engineers are working to find, monitor, control and, where possible, clean up the damage at the Nevada Test Site.

Come on Adam, let's get on the time machine so that we can leave the past and go to the present. I want to see what the scientists are doing today!



Color this page.

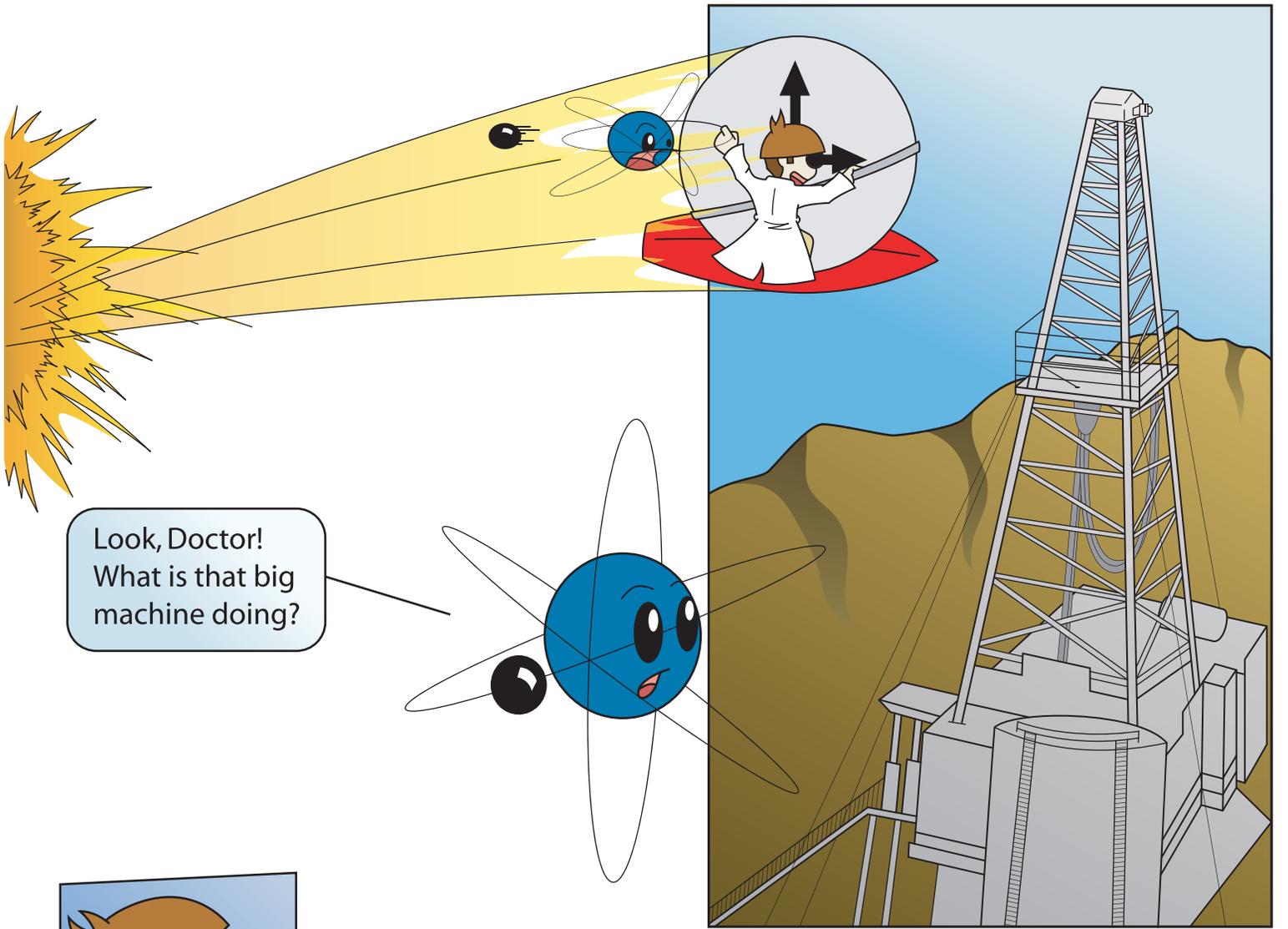
To the present...



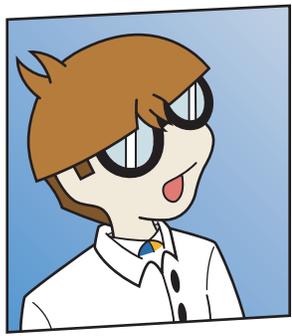
65 miles northwest of
Las Vegas, Nevada

**NEVADA
TEST SITE**



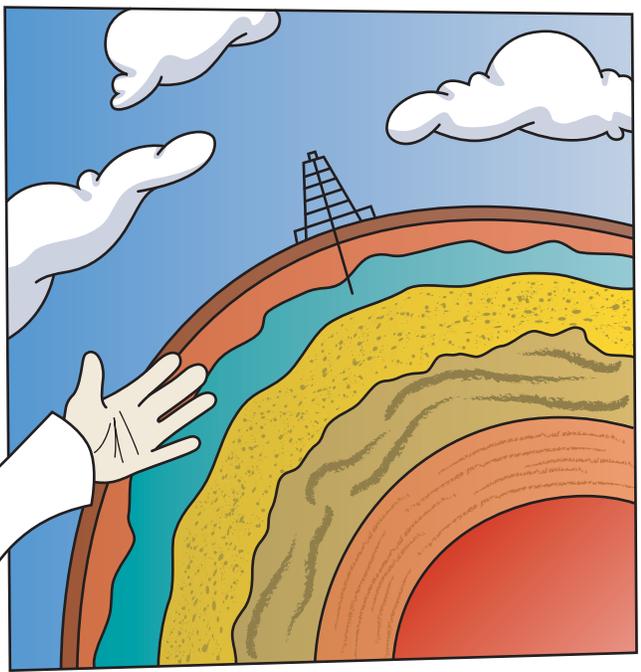
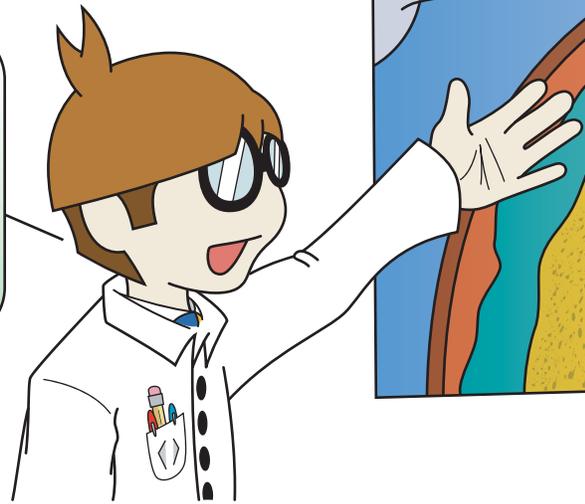


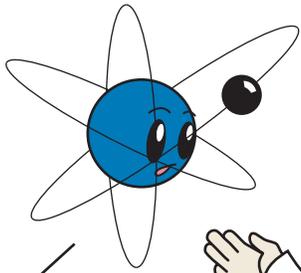
Look, Doctor!
What is that big
machine doing?



Well Adam, it is drilling
deep down into the earth
to see if there is any
contamination in the
groundwater.

Under many layers of rock and
dirt, deep below the earth's
surface, the groundwater
moves at different speeds in
many different directions, but
mostly downhill.

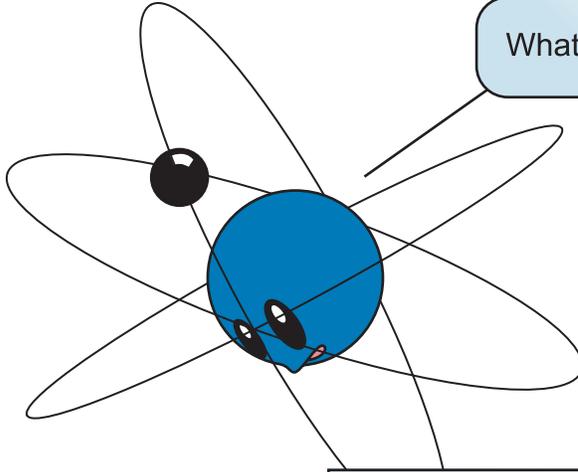




Doctor Proton?

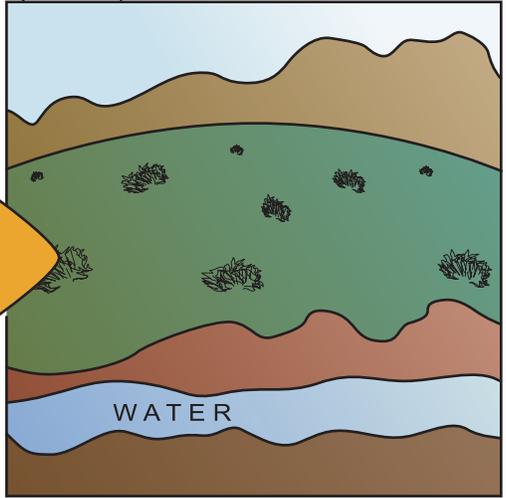
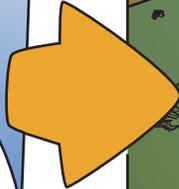
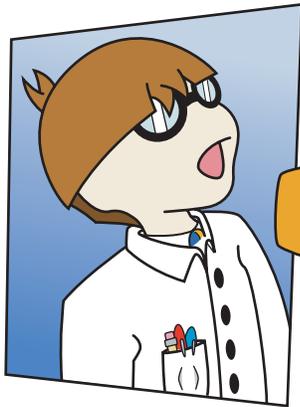


Yes, Adam?

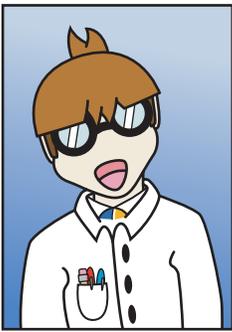
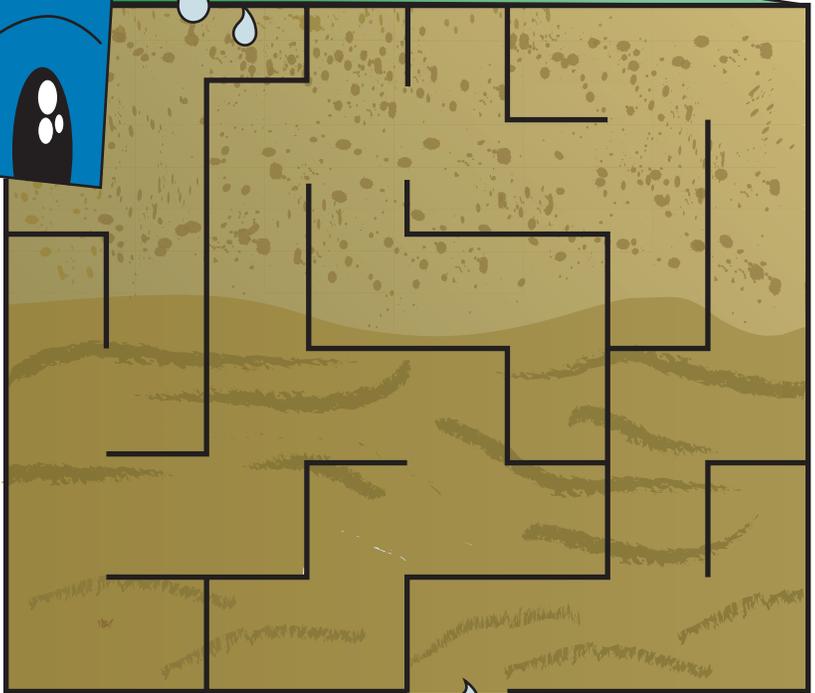
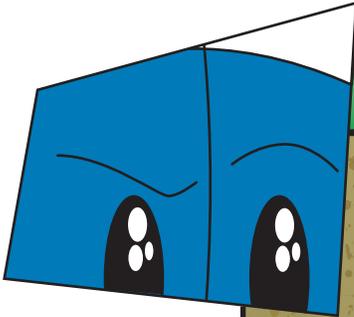


What is groundwater?

Well, groundwater means just what it sounds like, water that is in the ground.



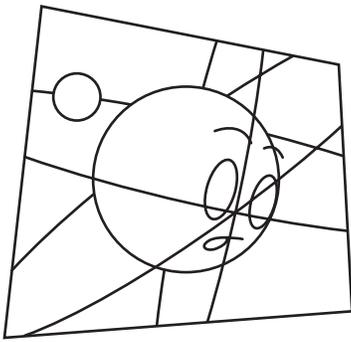
How does it get there?



When it rains, some water makes its way down through the dirt and different layers of rocks and collects underground.

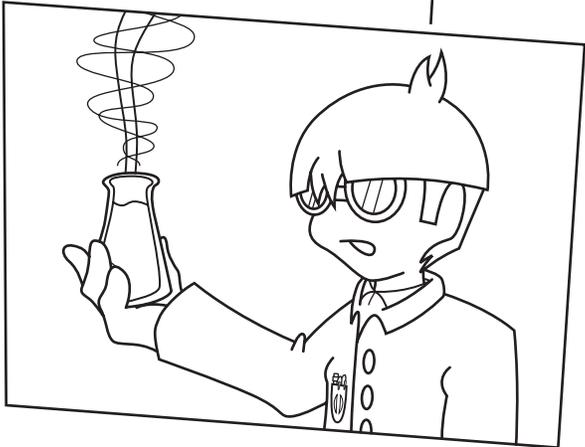
Can you help the raindrops reach the groundwater?



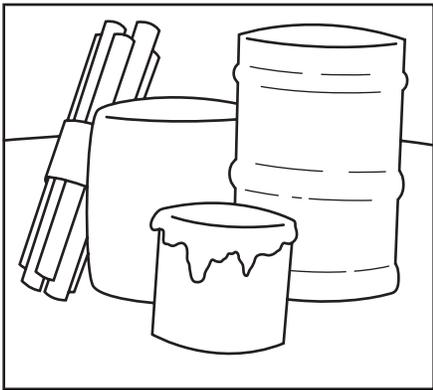


So what is contamination then, Doctor?

When I say that there is contamination in the water or dirt, it means that something harmful or unsafe has been added to it.

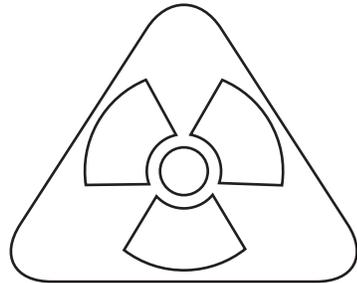


Workers at the Nevada Test Site look for two types of contamination.



One type of contamination is called "chemical," which is mostly metals, fuel, or paint left over from projects at the site.

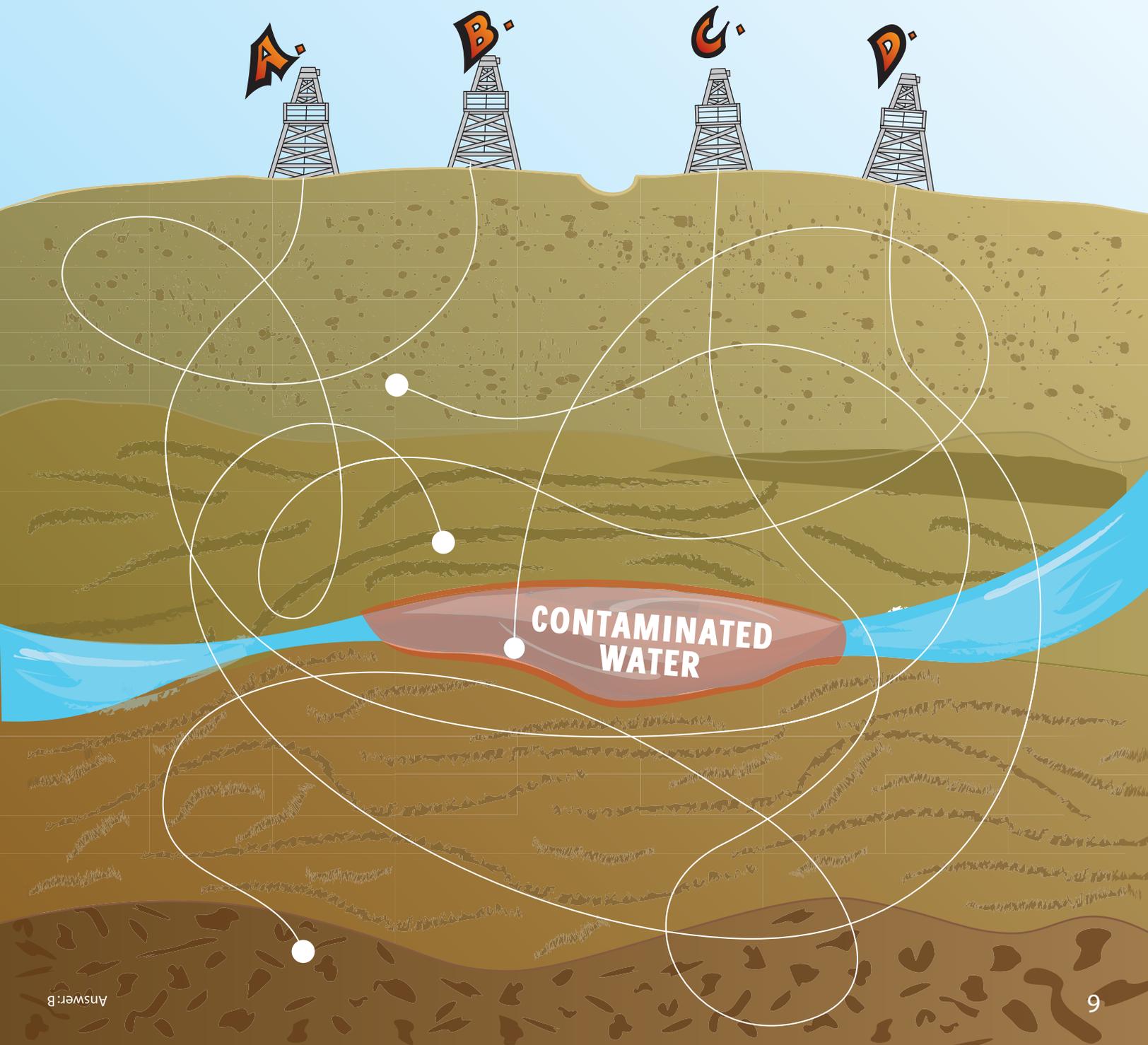
The other type is "radioactive" contamination.

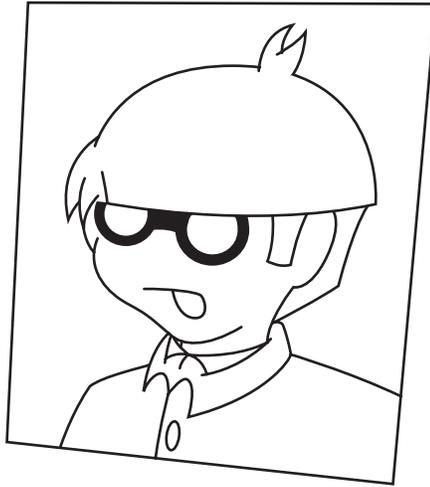
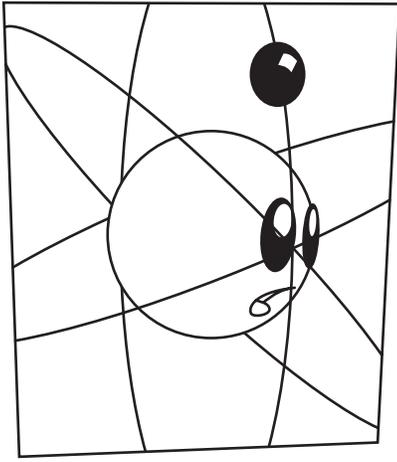




Workers at the Nevada Test Site are checking the water to see if there is any contamination. They are also tracking the way the water moves to make sure contamination stays far away from people.

Can you find which drill rig leads to the contaminated groundwater?

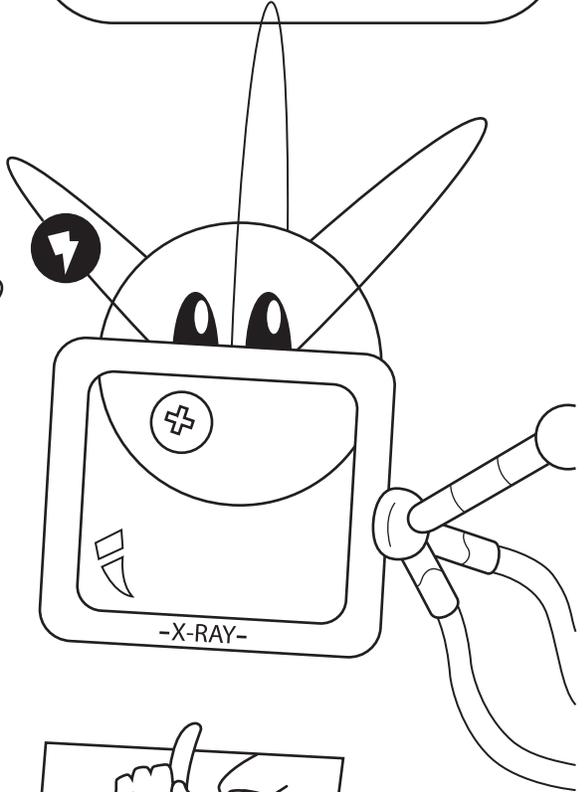
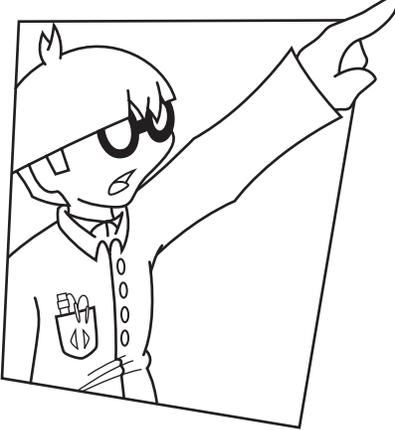




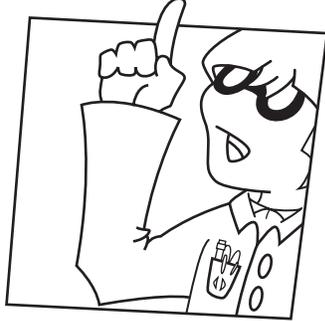
Well that's a good question, Adam. To answer it, let's take a look at what is inside of you, since you are a hydrogen atom.

Then what does radioactive mean?

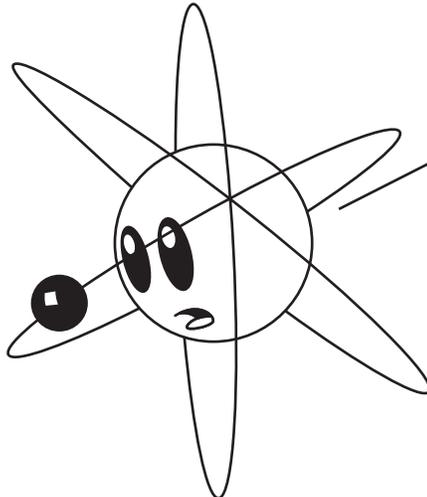
A hydrogen atom like you has one electron, which has a negative charge.



Hydrogen atoms also have one proton, which has a positive charge.



Those particles give atoms energy, just like food gives people energy.

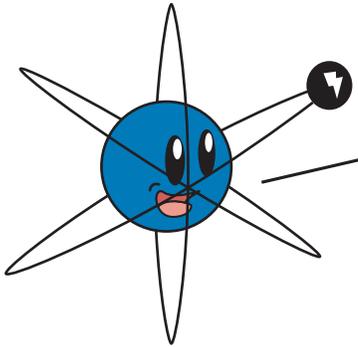


Wow...



Hey kids! Did You Know....

atoms are made up of electrons, protons and neutrons? Stable atoms have the same number of protons and neutrons which are surrounded by orbiting electrons.



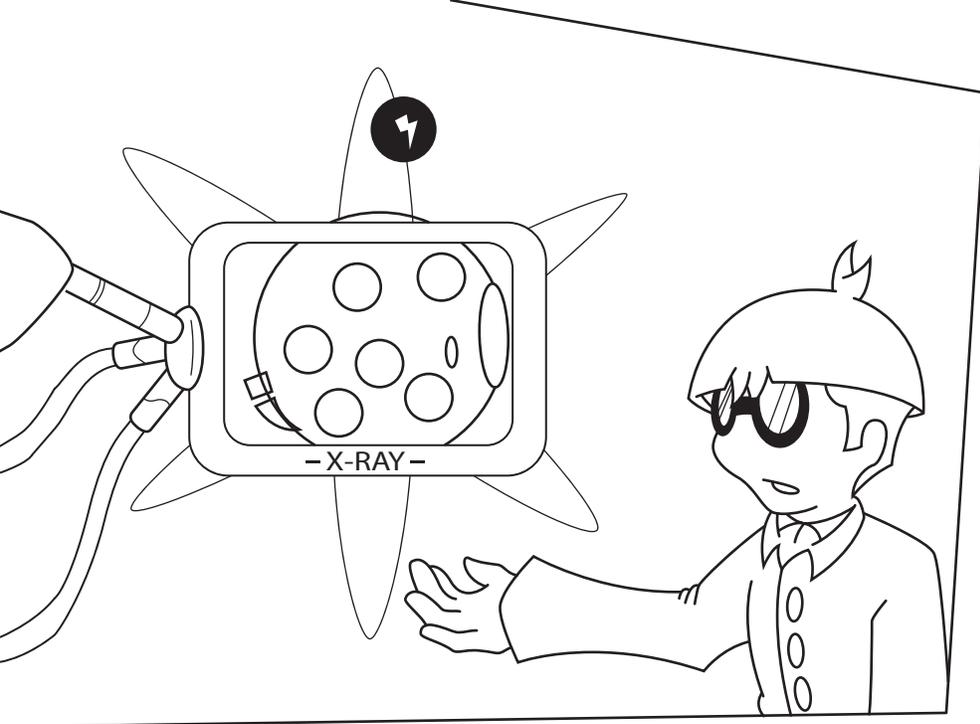
My floating electron gives me energy!

Can you find names of some foods that give you energy?

p	f	r	u	i	t	s	n	d	a
i	a	e	p	g	a	a	o	s	i
f	u	g	r	a	i	n	s	u	g
s	r	g	v	s	w	d	t	o	p
f	d	u	e	v	r	w	a	r	i
i	n	a	g	e	p	i	z	z	a
z	t	s	g	g	a	c	z	t	h
n	w	r	i	r	s	h	w	s	c
d	u	w	e	i	t	u	i	v	d
b	c	h	s	n	a	r	c	h	r

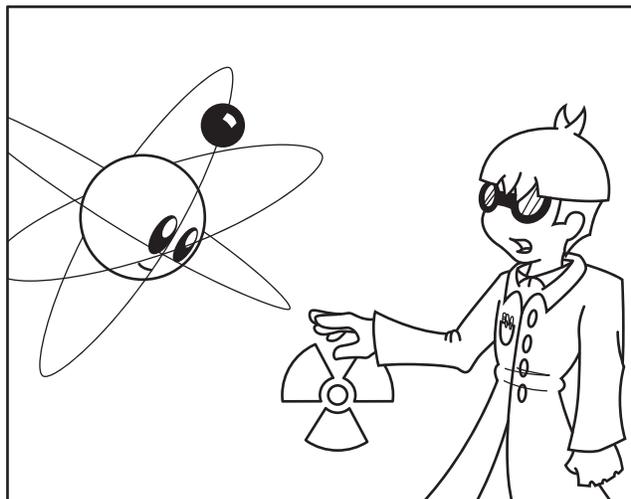
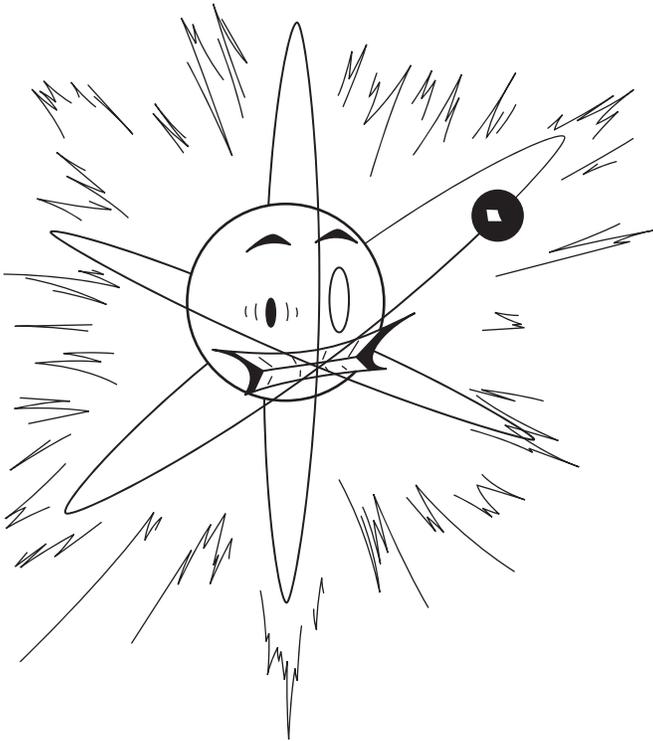
Word List

- veggies
- soup
- pasta
- sandwich
- burger
- pizza
- grains
- fruits

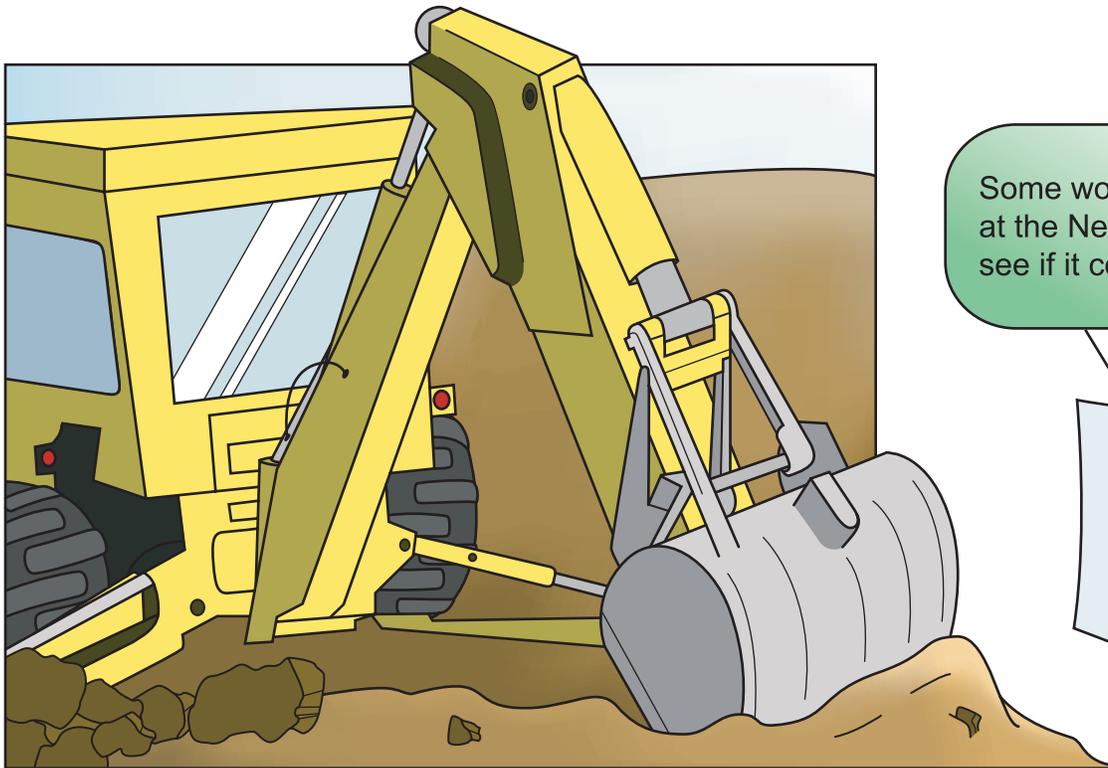


However, some atoms, like your brother Axel, have too many neutrons.

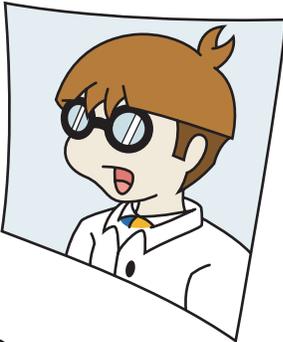
These extra neutrons give off too much energy which makes the atom unstable. This extra energy is called radiation. When atoms like Axel are found in places where they are not supposed to be, it's called contamination.



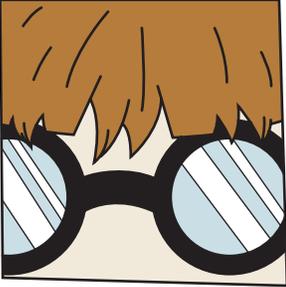
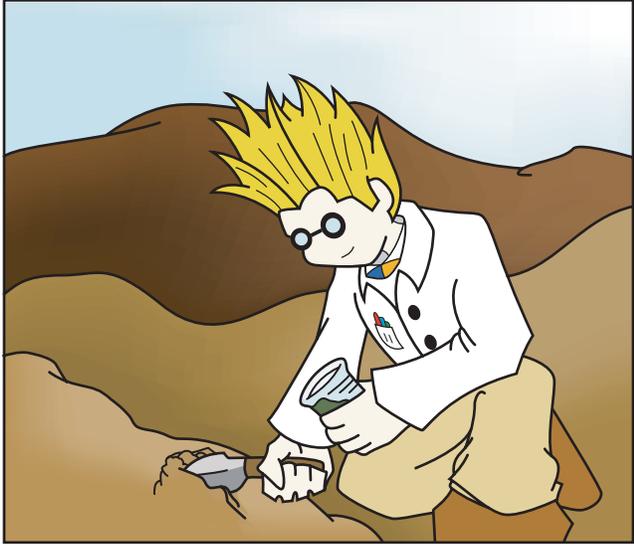
Most radiation is harmless in small amounts, but there are some forms that can make people very sick.



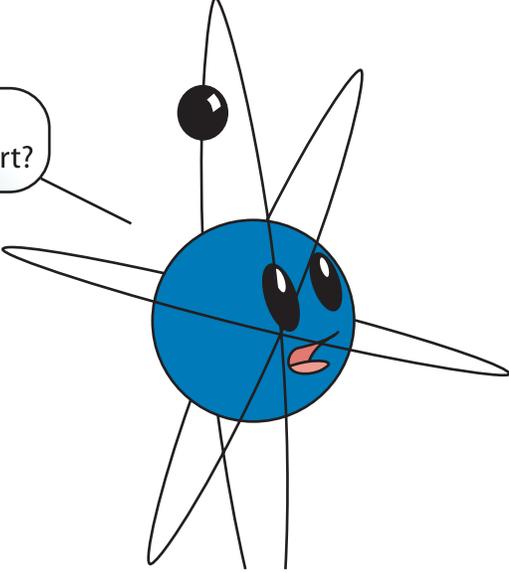
Some workers test the dirt at the Nevada Test Site to see if it could be contaminated.



They dig and dig. Then they fill small jars with the dirt samples.

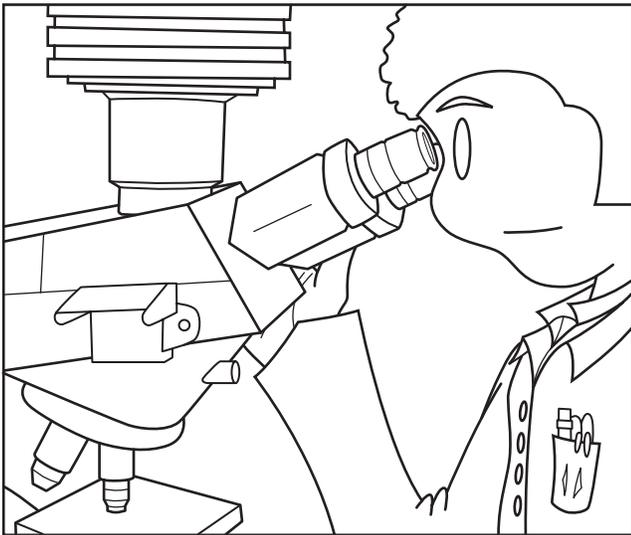


What do they do with the jars of dirt?

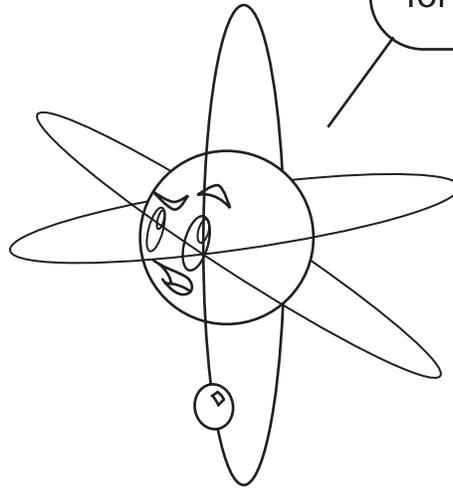


They send the jars to special laboratories so the scientists can test for contamination.

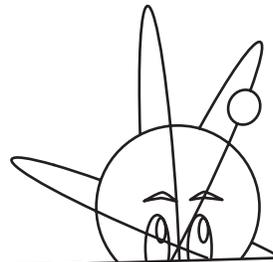




What do they look for in the samples?



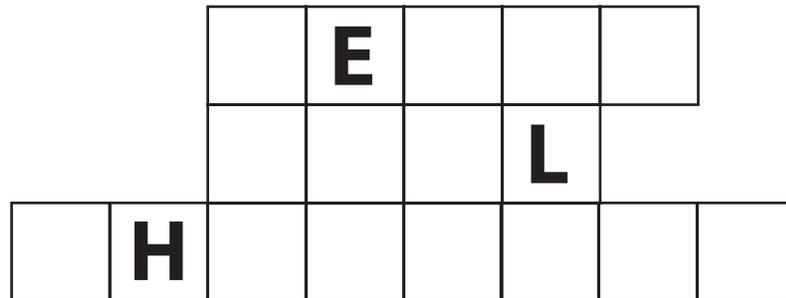
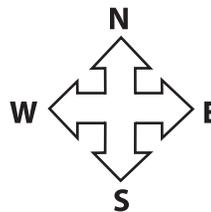
To find out, use the compass directions to place the missing letters of the alphabet in the correct locations.



If you need help, be sure to ask.

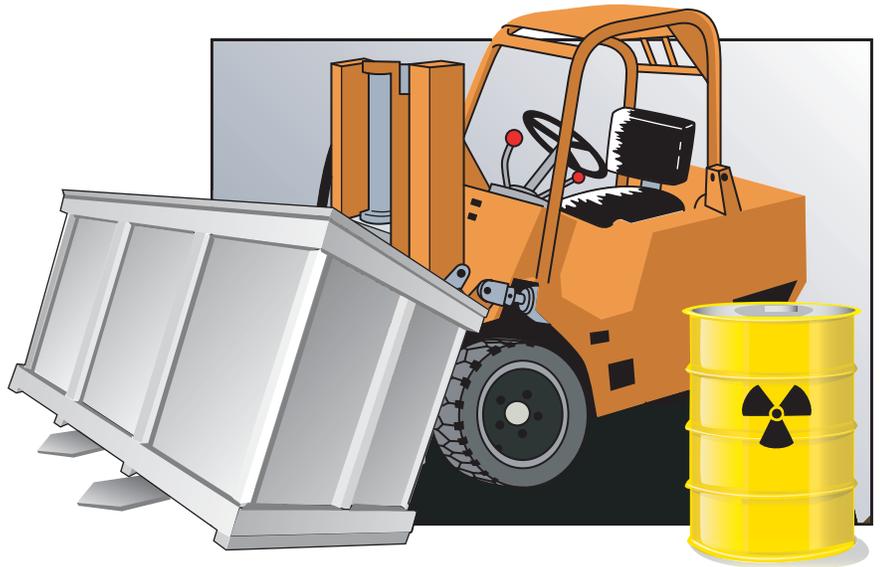
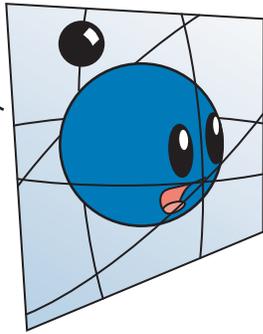
Directions:

- U is south of E : L is south of A
- E is west of L and south of T
- E is east of H and west of M
- C is south of L and west of A
- F is west of U and south of M
- L is east of A (2 times)
- I is east of M : C is west of H

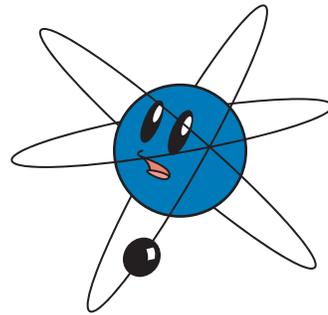
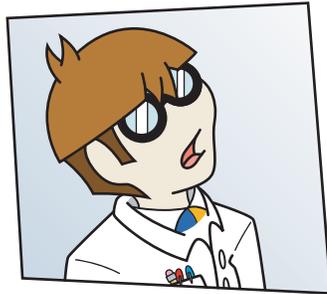


Answers: 1. Metal 2. Fuel 3. Chemical

What is that, Doctor?



That is a forklift. It is used to move boxes and drums that are too heavy for people to move on their own.

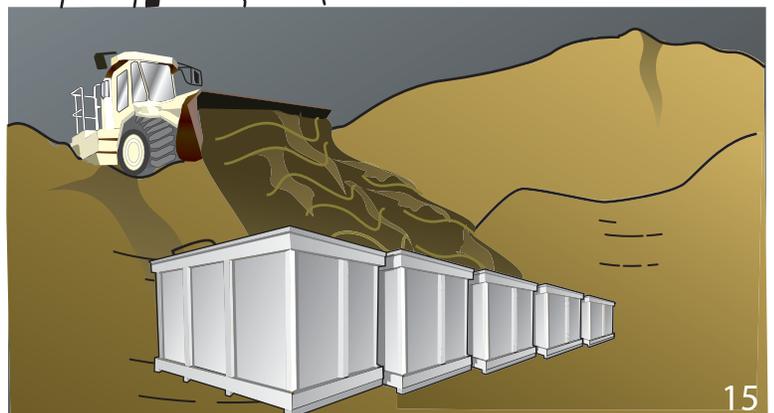
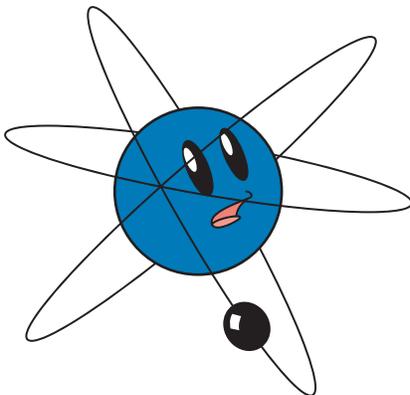


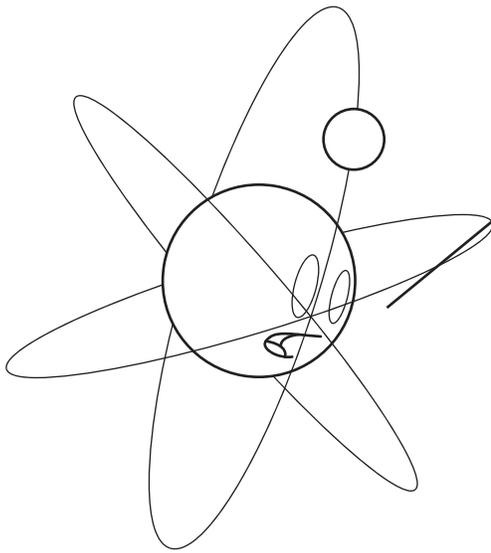
What is in the drums and boxes?

Well you see Adam, as workers clean up the Nevada Test Site, they collect items that are no longer needed, which is called waste.



For example, tools that are contaminated and can no longer be used are placed with other contaminated trash into drums or boxes.



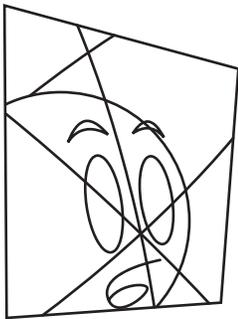


So what other things are in the boxes?

Unscramble the words below and find out.



Use the clues to help you figure out the answers.



Clues

1- lvgseo
rhymes with doves

2- rowk holtecs
what people wear on the job

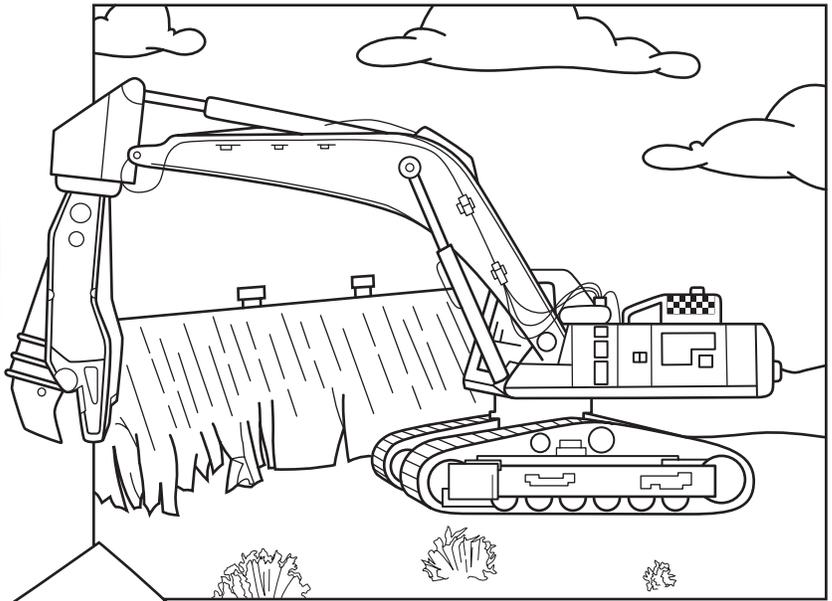
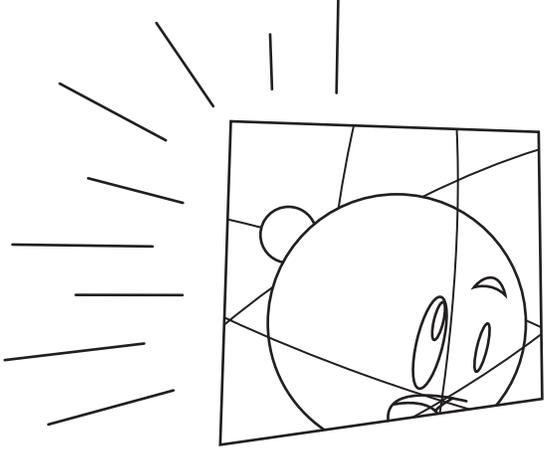
3- nospegs
used to clean up watery spills

4- inpta
used to color walls

5- tidr
mixes with water to make mud

6- semichalc
parents use these to clean

- 1) ○○○○○○
- 2) ○○○○ ○○○○○○○○
- 3) ○○○○○○○○
- 4) ○○○○○○
- 5) ○○○○
- 6) ○○○○○○○○○○

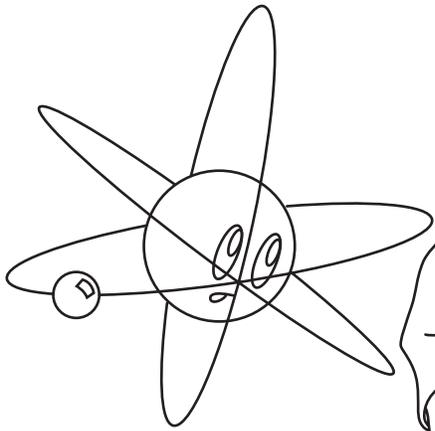


Whoa! What kind of truck is that, Doctor!?

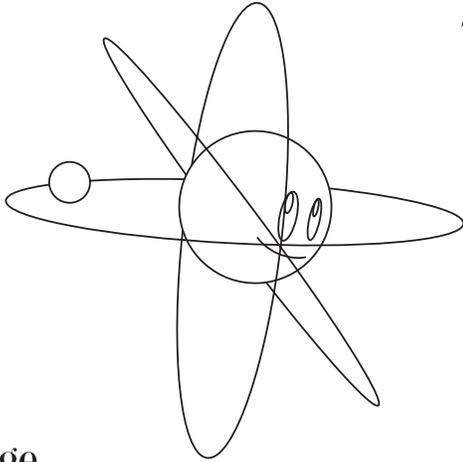


That is called hydraulic shears, Adam.

It works like a big pair of scissors to help workers cut contaminated buildings into pieces.



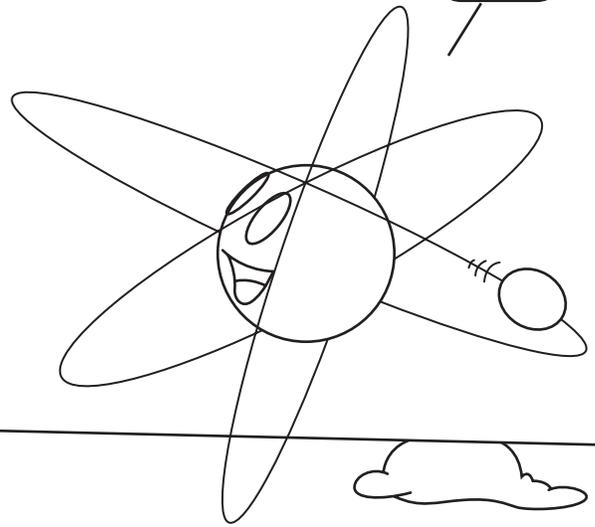
That is one of the many tools used to help workers do their jobs faster, safer and easier.



Sometimes workers have to be outside in the hot sun. So to keep them cool, they wear a cool suit.

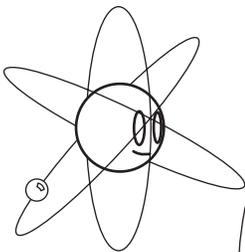
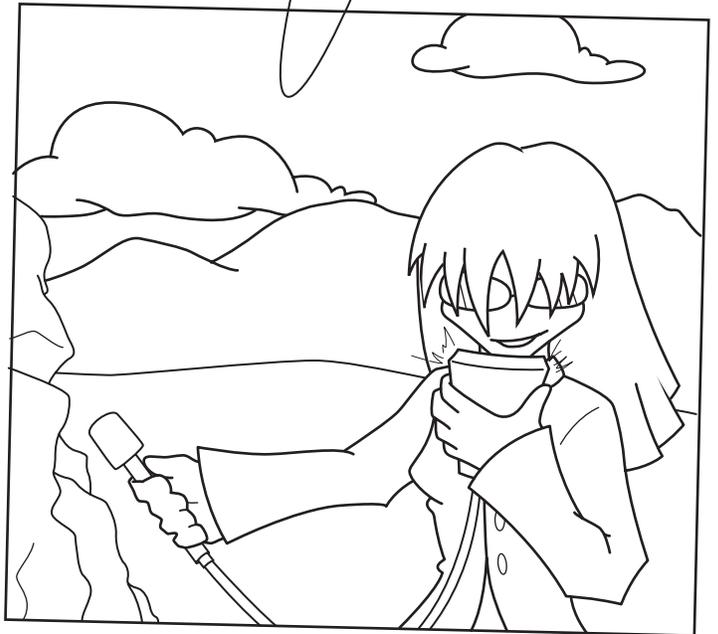


Cool!

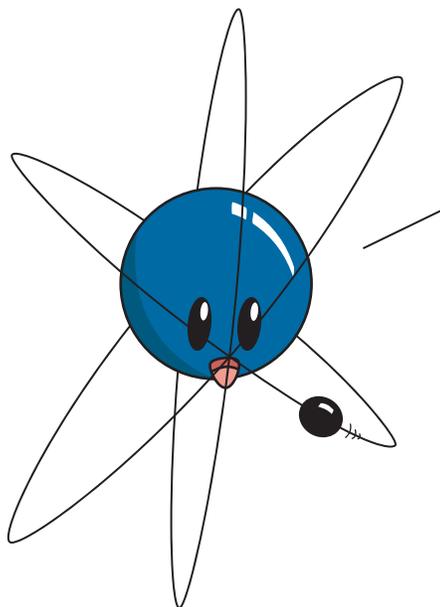


It works by moving cold water through tubes that travel all over the suit.

To help clean up the Nevada Test Site, workers also use tools called sensors which help detect harmful materials in the dirt and water.

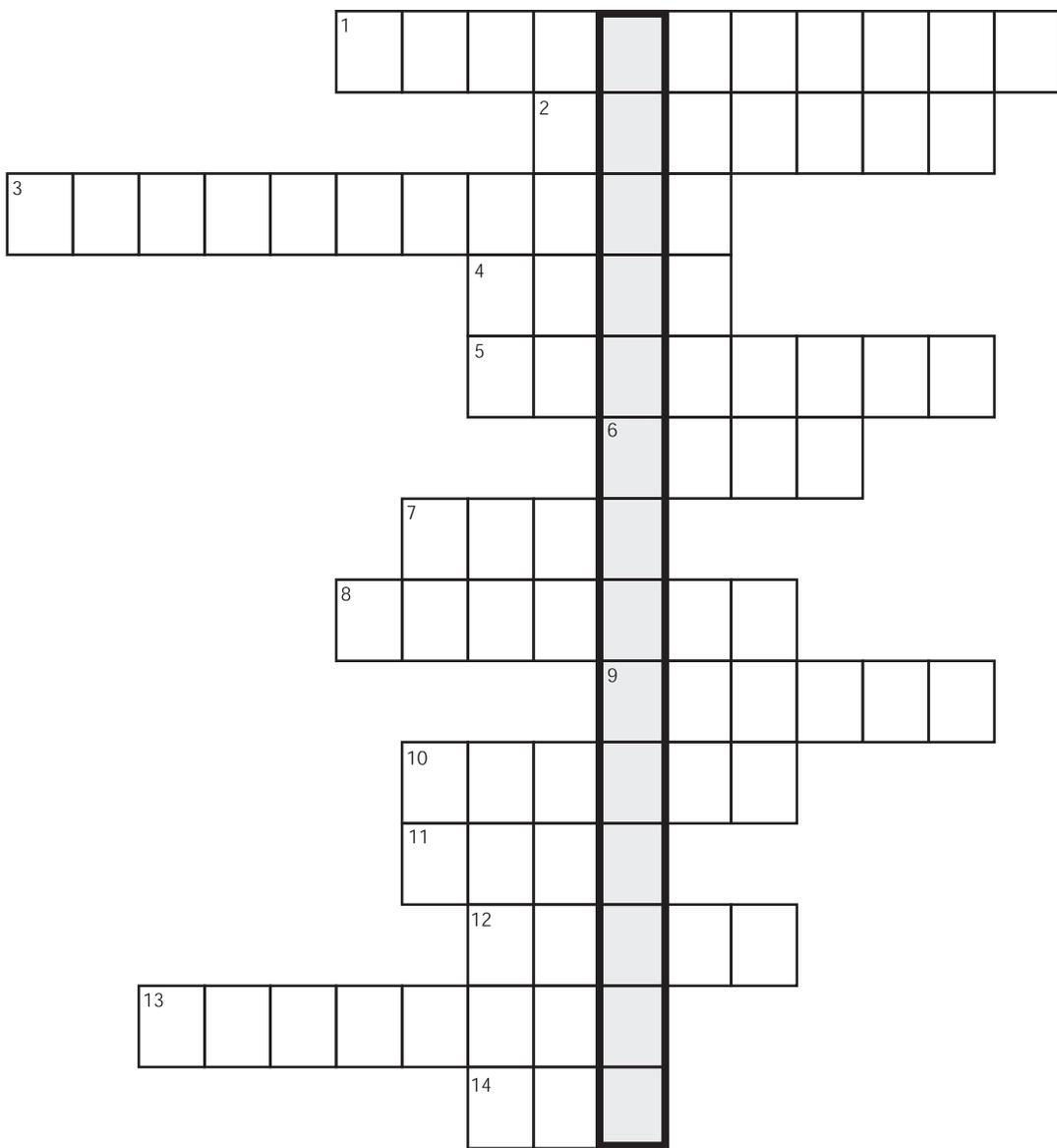


Some of the sensors can change colors to warn of harmful materials that may be nearby.



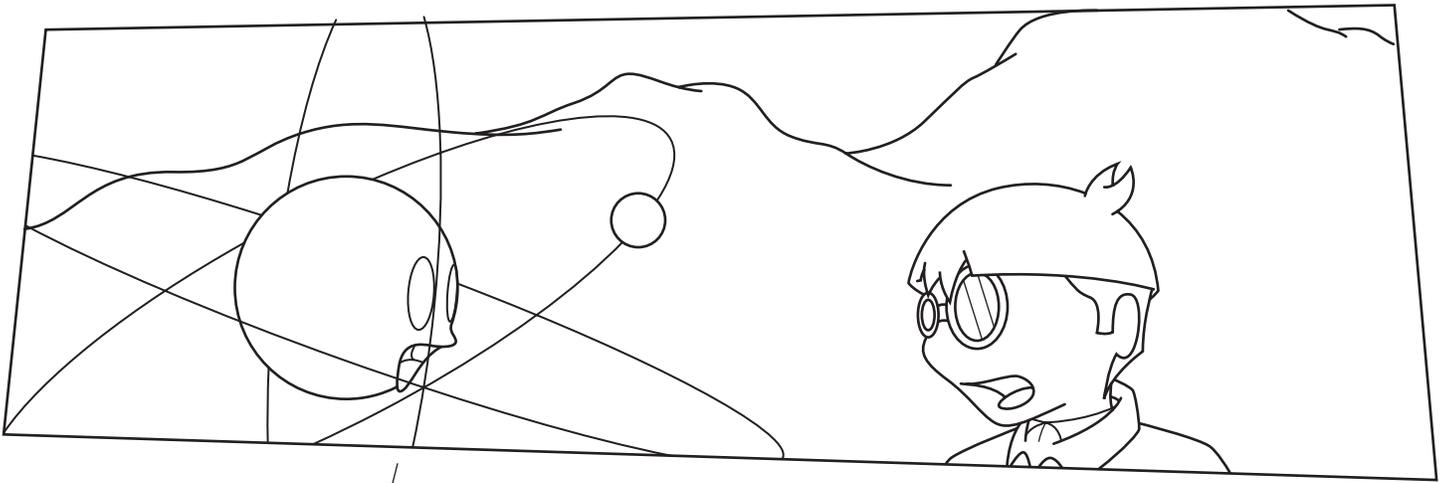
Wow! The Nevada Test Site is a busy place! With all the things they do, it is sometimes hard to remember all of them.

Try to solve the puzzle below to help you remember.



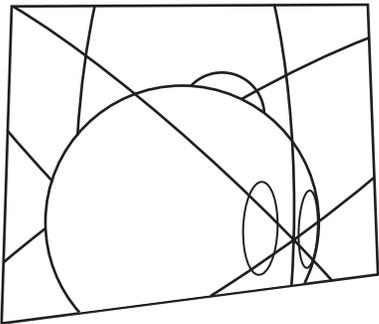
- ### Clues
- 1) Water from the ground
 - 2) Used to detect harmful materials
 - 3) A type of contamination
 - 4) _____ the Atom, Doctor Proton's sidekick
 - 5) Adam is a _____ atom
 - 6) Adam's unstable, radioactive brother
 - 7) Workers wear a cool _____ when it is hot
 - 8) Big holes in the ground left by explosions
 - 9) Hydraulic _____ are used to help workers tear down buildings
 - 10) Doctor _____, Adam's partner
 - 11) Samples are collected in _____
 - 12) How workers get to the groundwater.
 - 13) Used to move very heavy boxes
 - 14) The number of protons Adam has

Answers: 1. Groundwater 2. Sensors 3. Radioactive 4. Adam 5. Hydrogen 6. Axel 7. Suit 8. Craters 9. Shears 10. Proton 11. Jars 12. Drill 13. Forklift 14. One



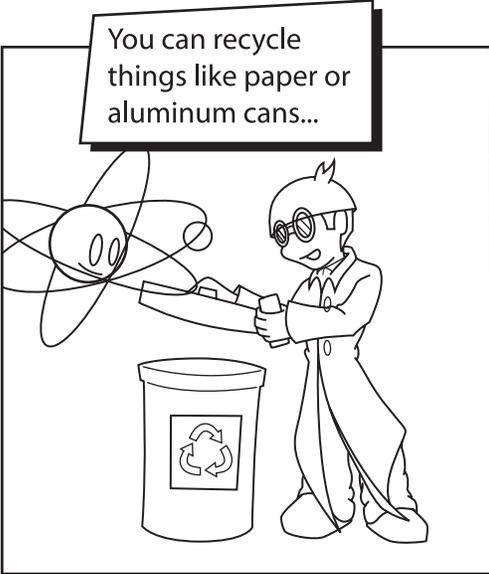
Well, Doctor Proton, a lot is happening out here at the Nevada Test Site.

That's right, Adam, and we only looked at the things being done to clean up the Test Site and the environment.

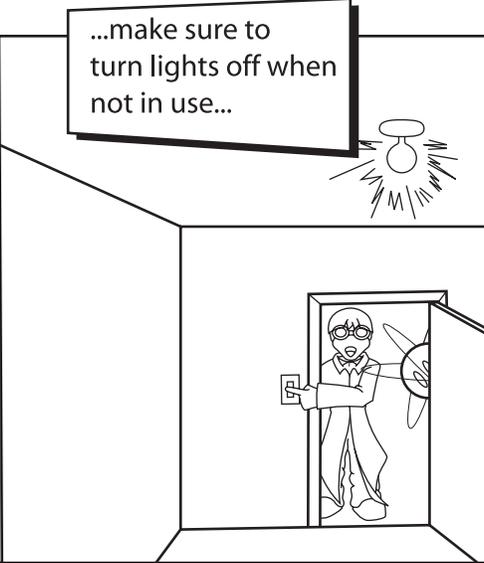


Is there anything I can do to help the environment?

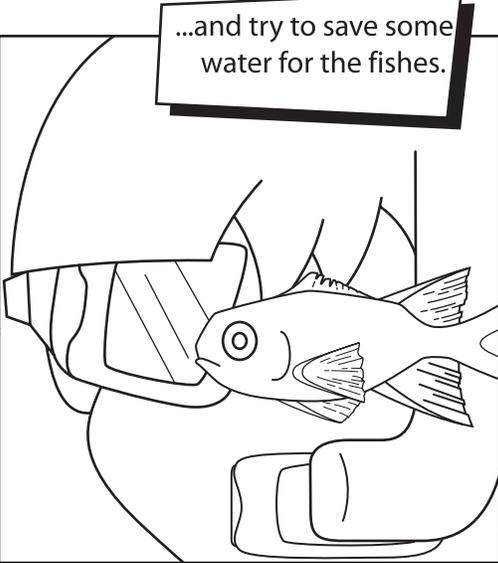
I'm glad you asked Adam, because there are many ways you can help...



You can recycle things like paper or aluminum cans...



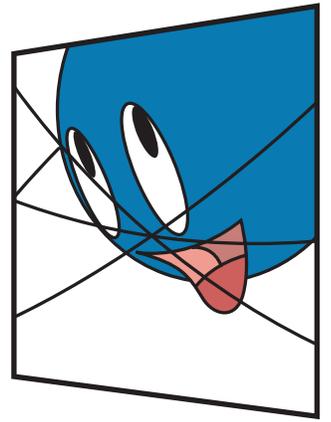
...make sure to turn lights off when not in use...



...and try to save some water for the fishes.

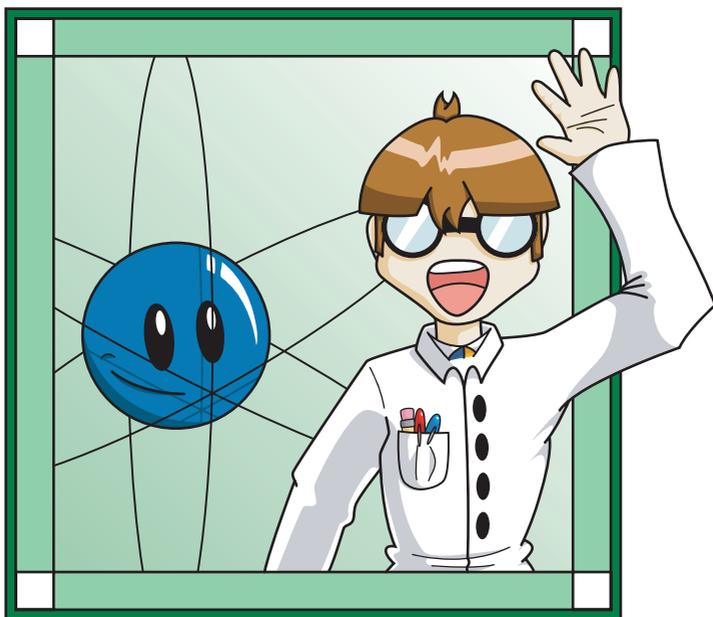
Can you think of other things you can do to help the environment?

Draw your ideas in the space below.



A large, empty rectangular area with rounded corners, framed by a thick dark blue border and a thin white inner border, intended for drawing ideas.

Let's all do our part to help the environment!



This book was brought to you by your friends at the Nevada Test Site.

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