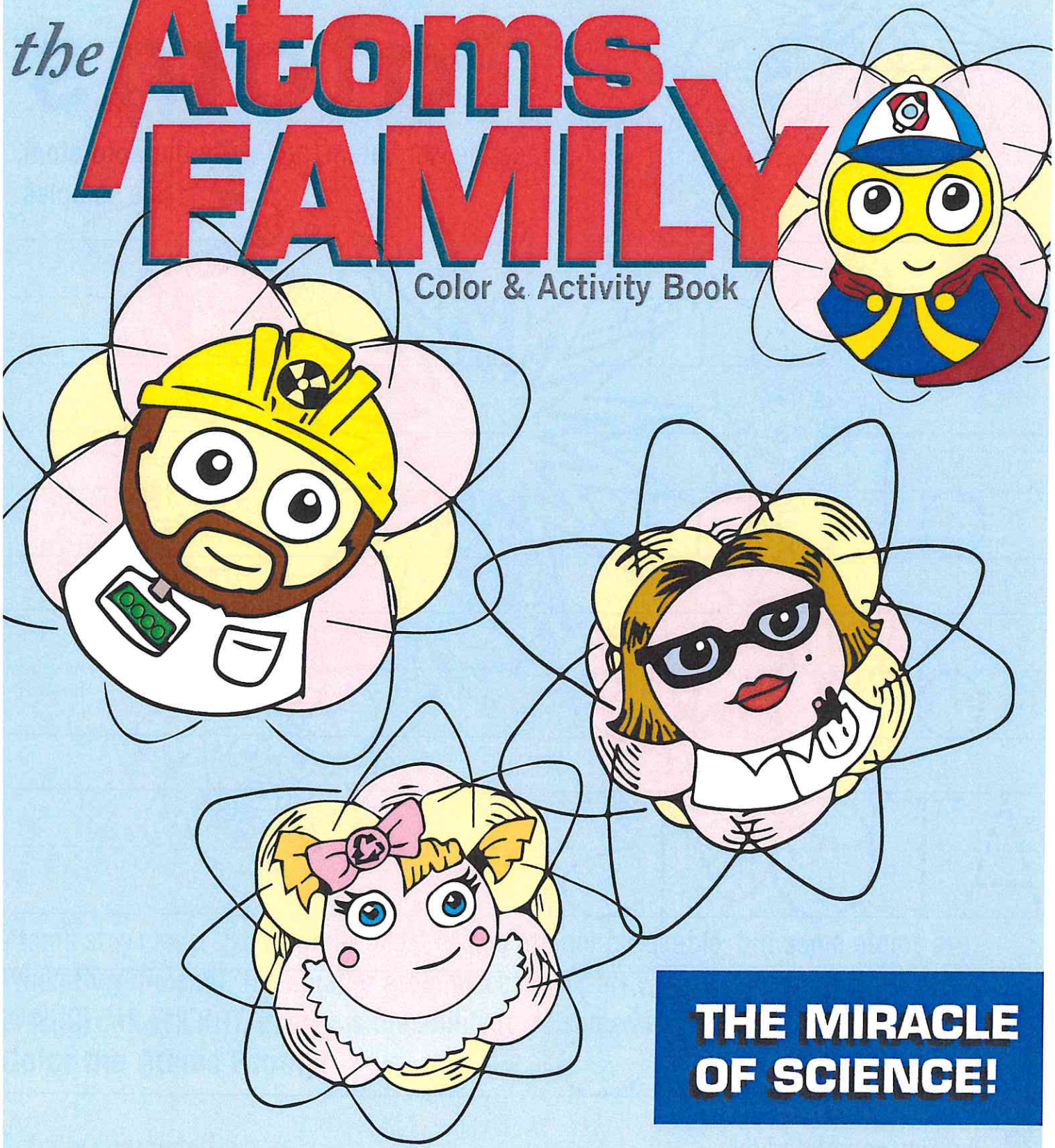
American Nuclear Society

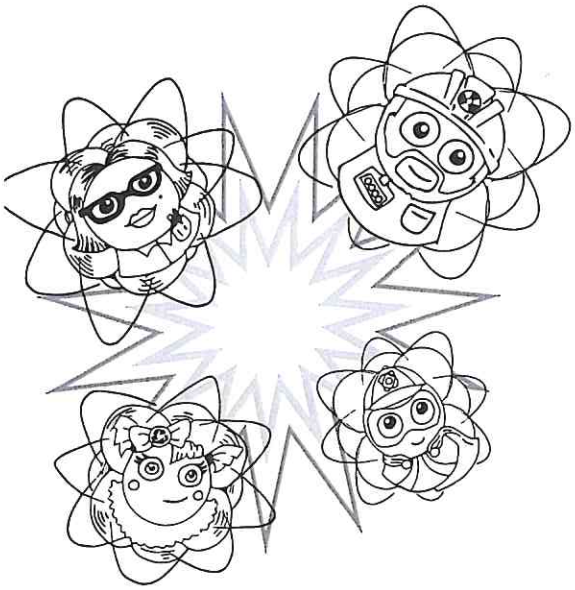
the Atoms FAMILY

Color & Activity Book



THE MIRACLE OF SCIENCE!

Information and Activities for Students from K through 5



Just like a beach is made of many grains of sand, everything in our world is made up of many very tiny pieces too small to be seen. We call these pieces ATOMS.

atoms

Trace the word atom, and write the word atom. See samples.

atoms

atoms

atoms

ATOMS

ATOMS

2 Activity completed by: _____

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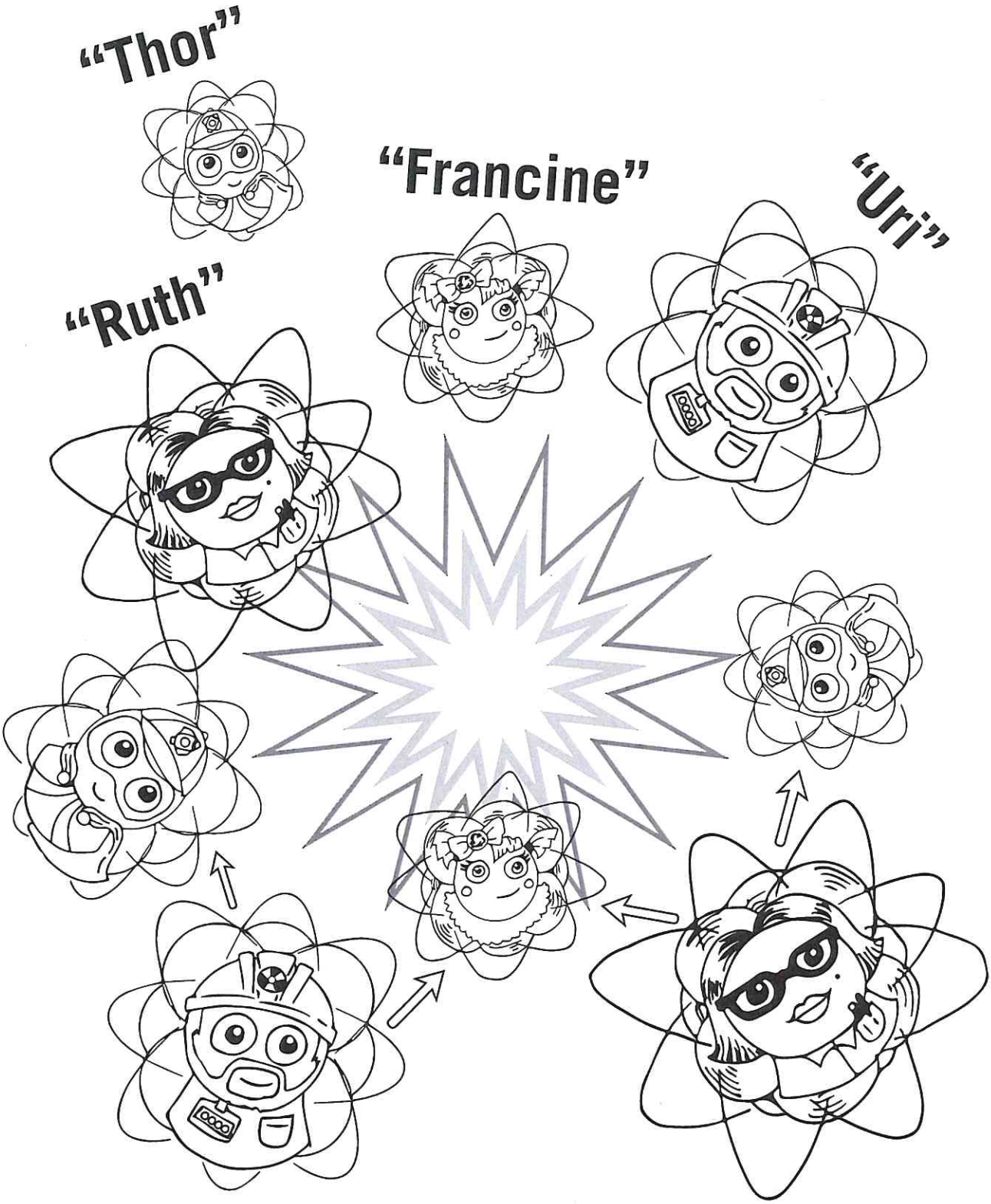

Atoms stay close, like a family. Most atoms are not breakable, but some atoms are. When they are split, the smaller atom pieces fly apart very fast. This is called ATOMIC or NUCLEAR ENERGY. Energy is the ability to do some kind of work.

Color the Atoms Family!

Activity completed by: _____

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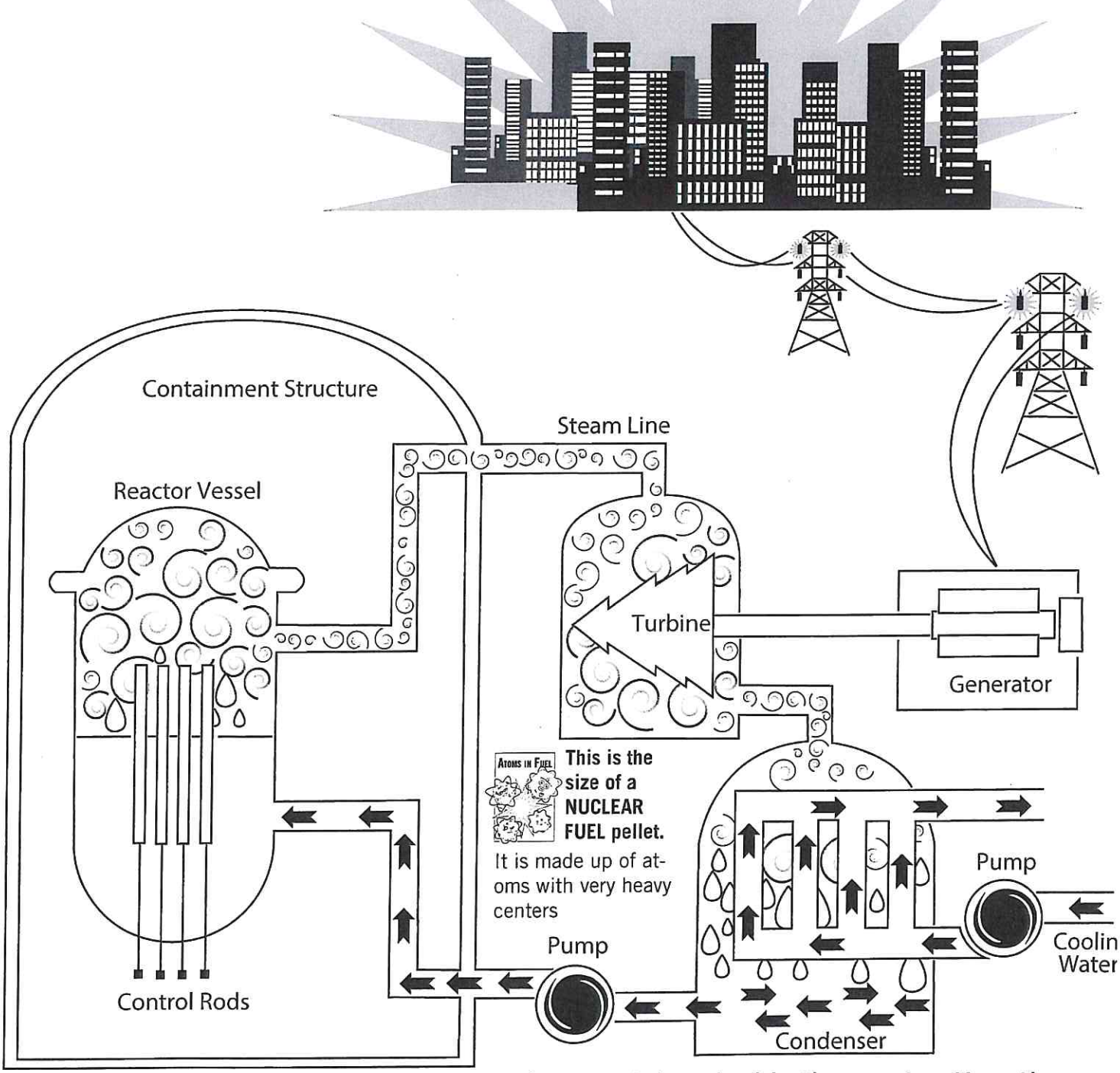
The breakable atoms are split inside a big container called a NUCLEAR REACTOR. The nuclear reactor is a very important part of the NUCLEAR POWER PLANT, the place where ELECTICITY is made— just as your heart is important to your body.



Many of these solid fuel pellets are put in a container inside the reactor. Here the tiny atoms in these pellets are split. Their pieces hit other atoms, and they are split, too. This energy action makes heat. The heat boils water, which turns into steam— just like in a tea kettle.

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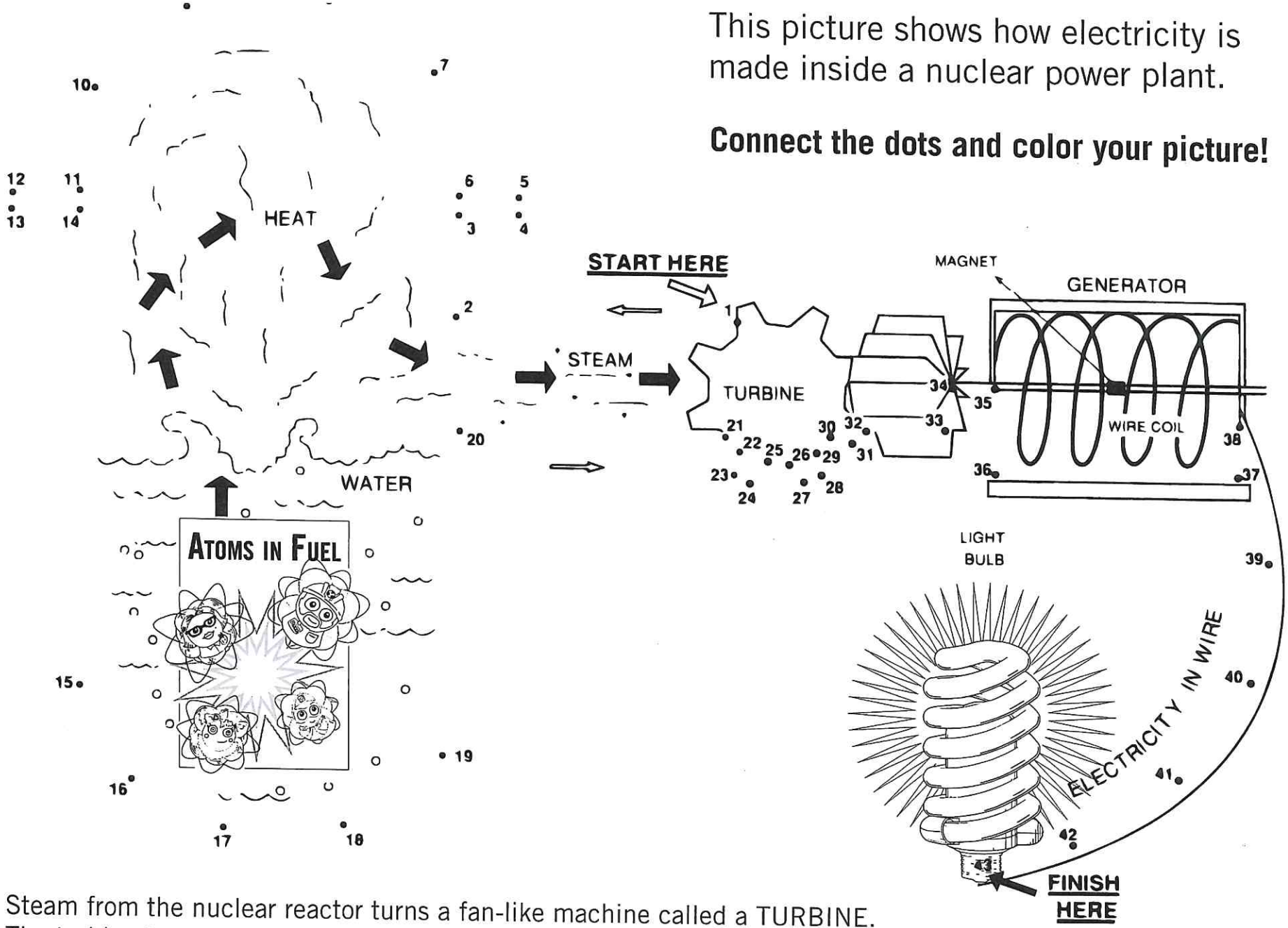
This picture shows how electricity is made inside a nuclear power plant.

Connect the dots and color your picture!



Steam from the nuclear reactor turns a fan-like machine called a TURBINE. The turbine turns a machine called a GENERATOR. It has a magnet inside. The magnet spins inside a wire coil. This makes electricity, which flows through wires from the powerplant to your home.

Activity completed by: _____

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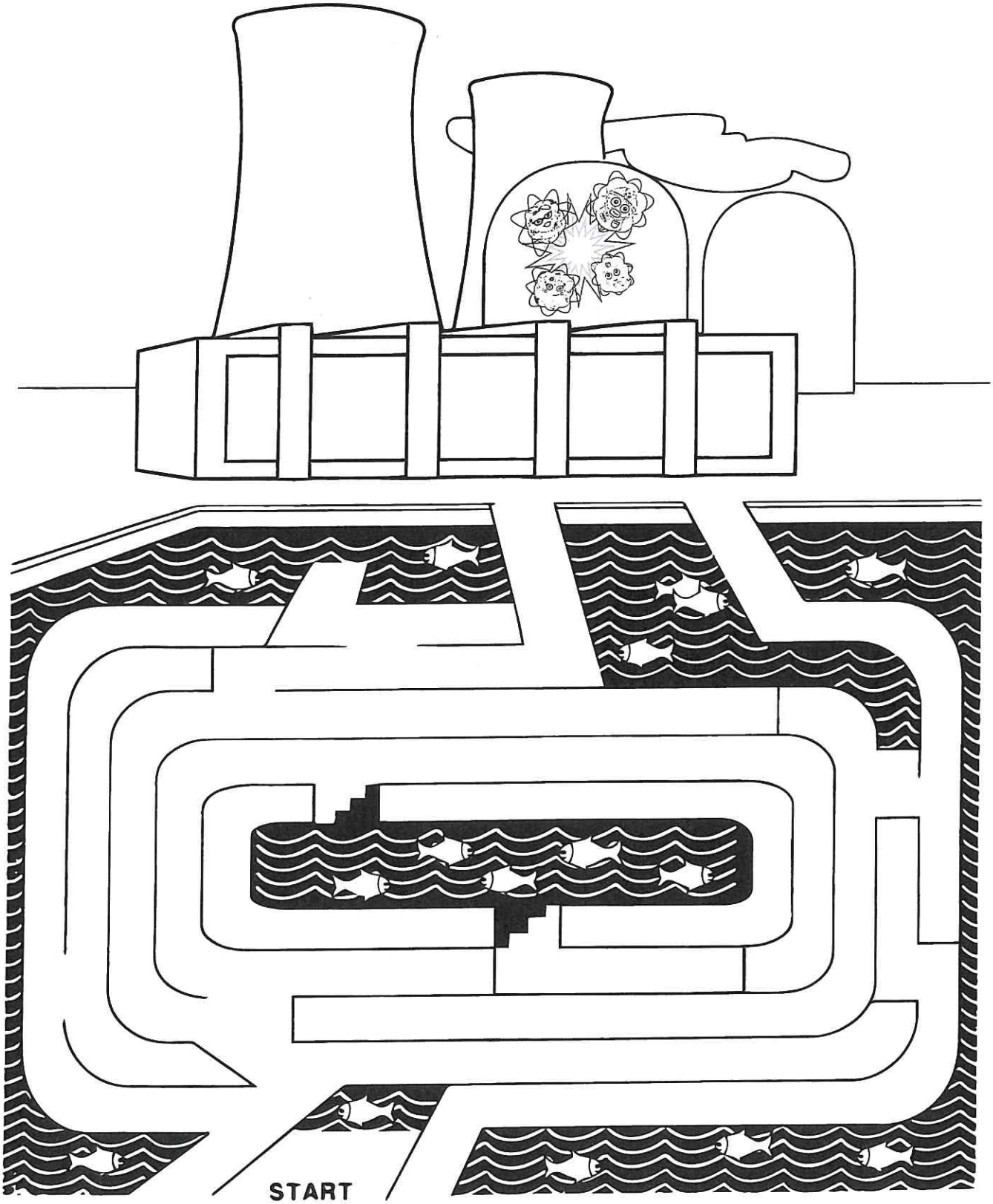
Nuclear power plants, like this one, need water to make electricity.



Which of the paths will bring water to the nuclear power plant?

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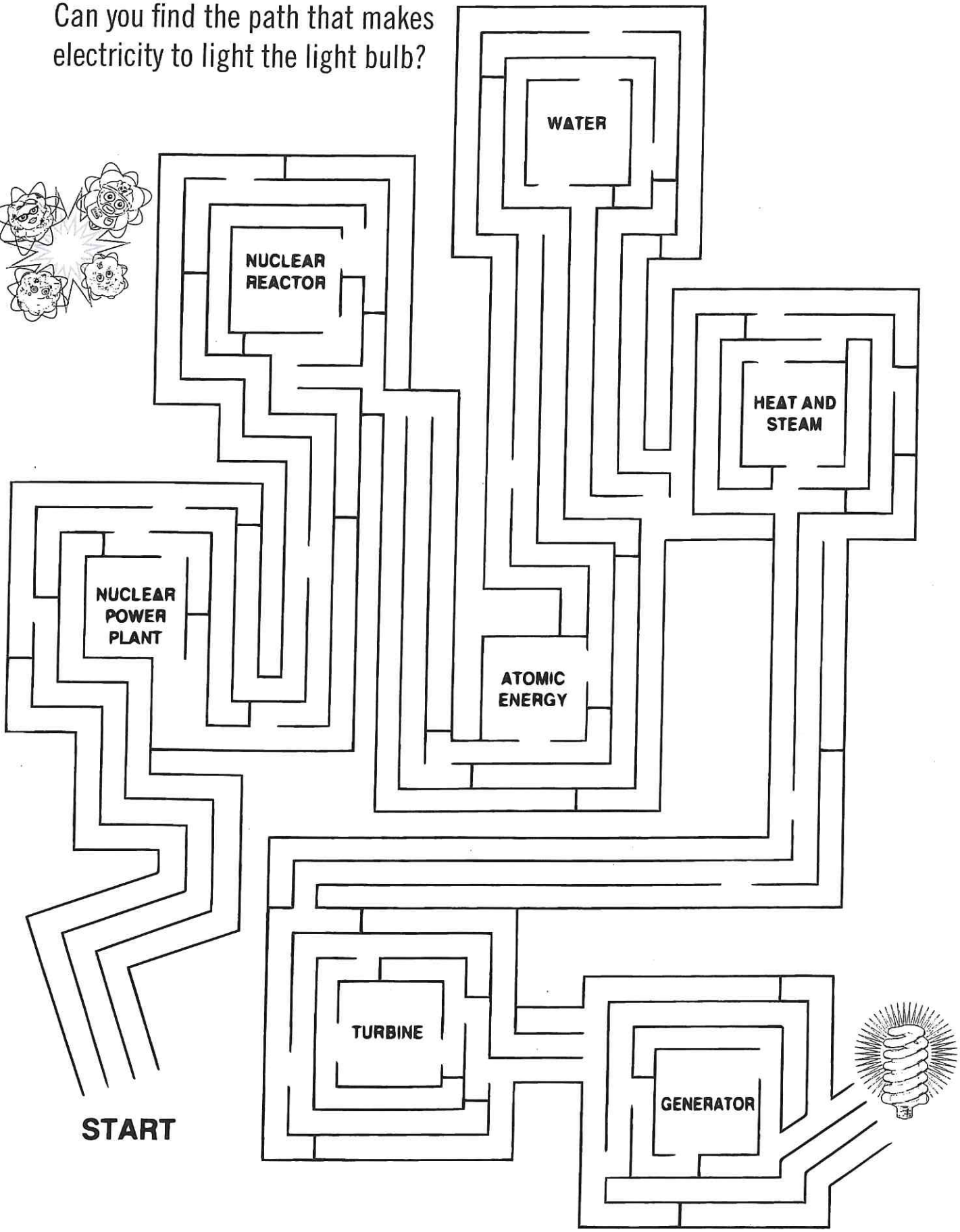
Can you find the path that makes electricity to light the light bulb?



Activity completed by: _____

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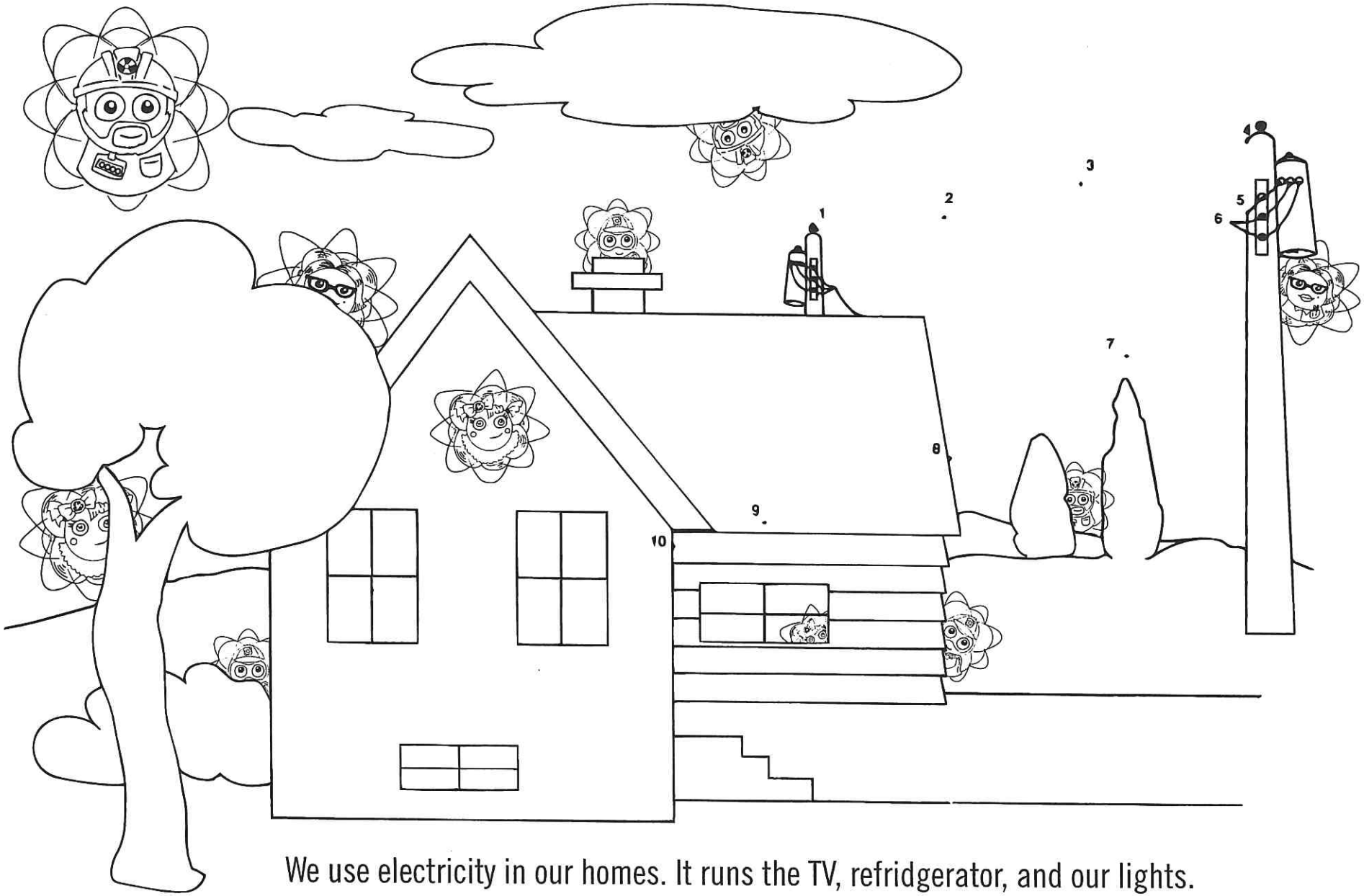
Can you find 11 atoms on this page? **Color them.**



We use electricity in our homes. It runs the TV, refridgerator, and our lights. Electricity comes to our homes through wires from the power plant. Follow the dots to connect the wires to the house. **Color the picture.**

Activity completed by: _____

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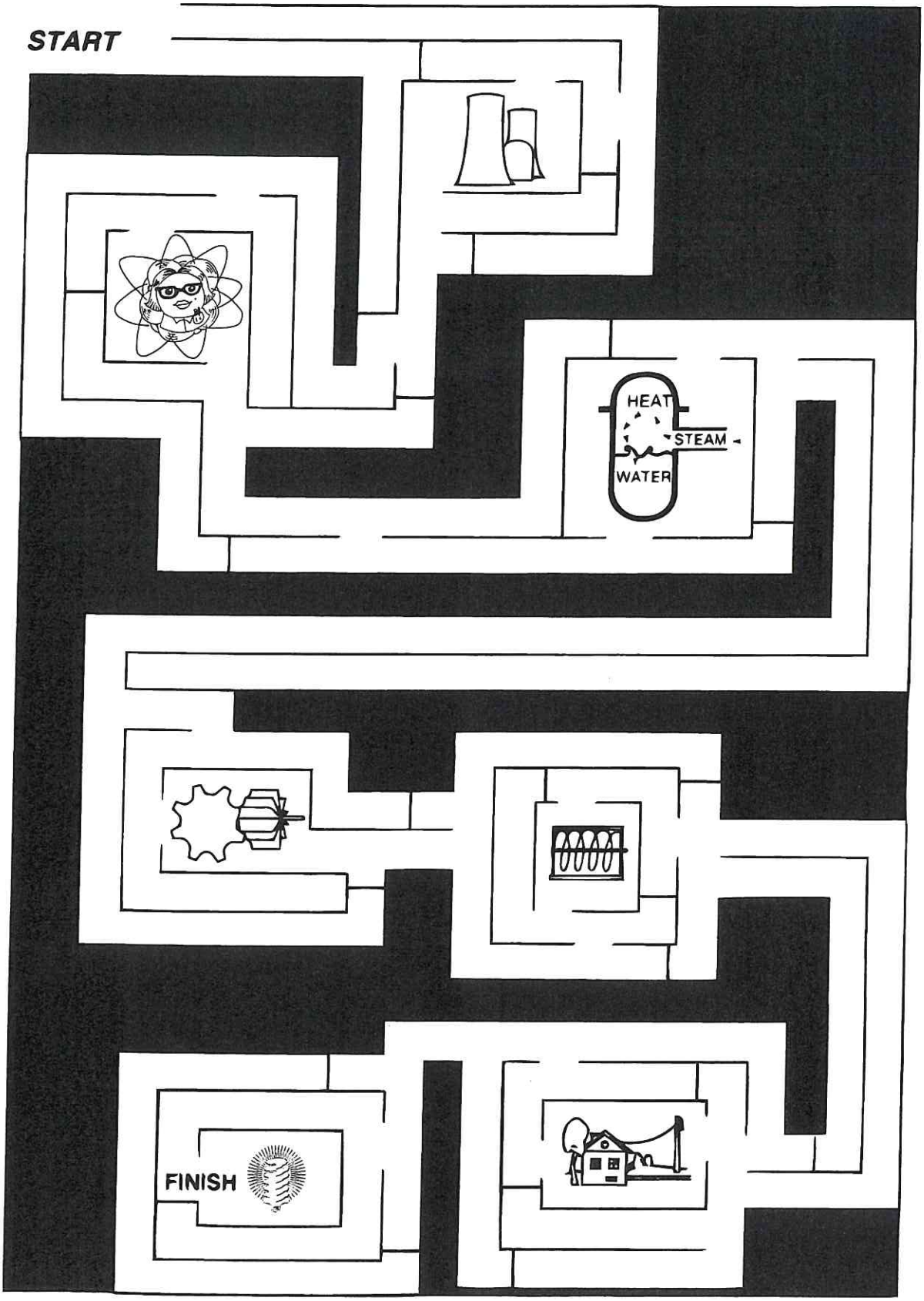
Can you find the path that makes electricity and brings it to your home?



Activity completed by: _____

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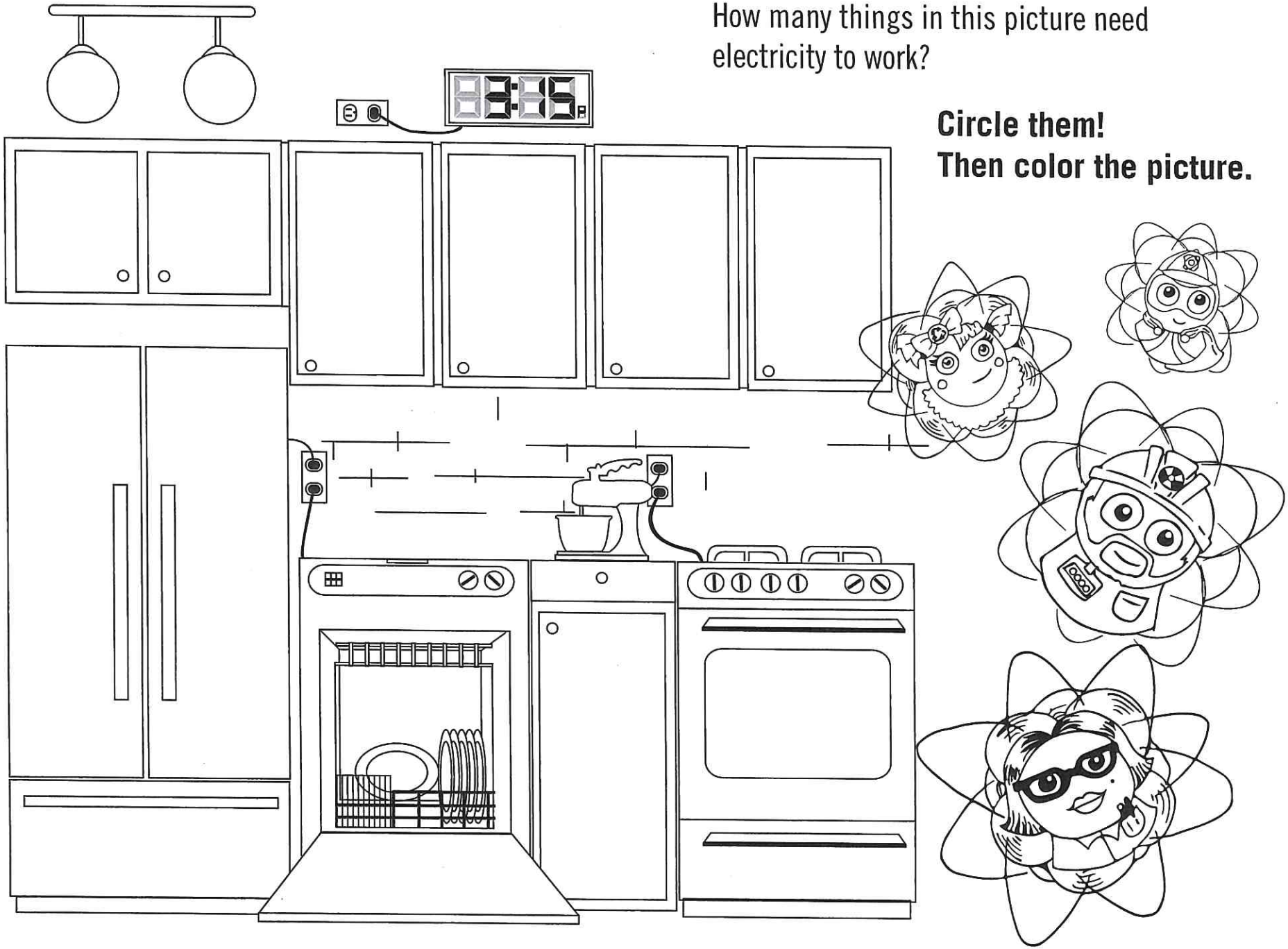
How many things in this picture need electricity to work?

Circle them!
Then color the picture.



Activity completed by: _____

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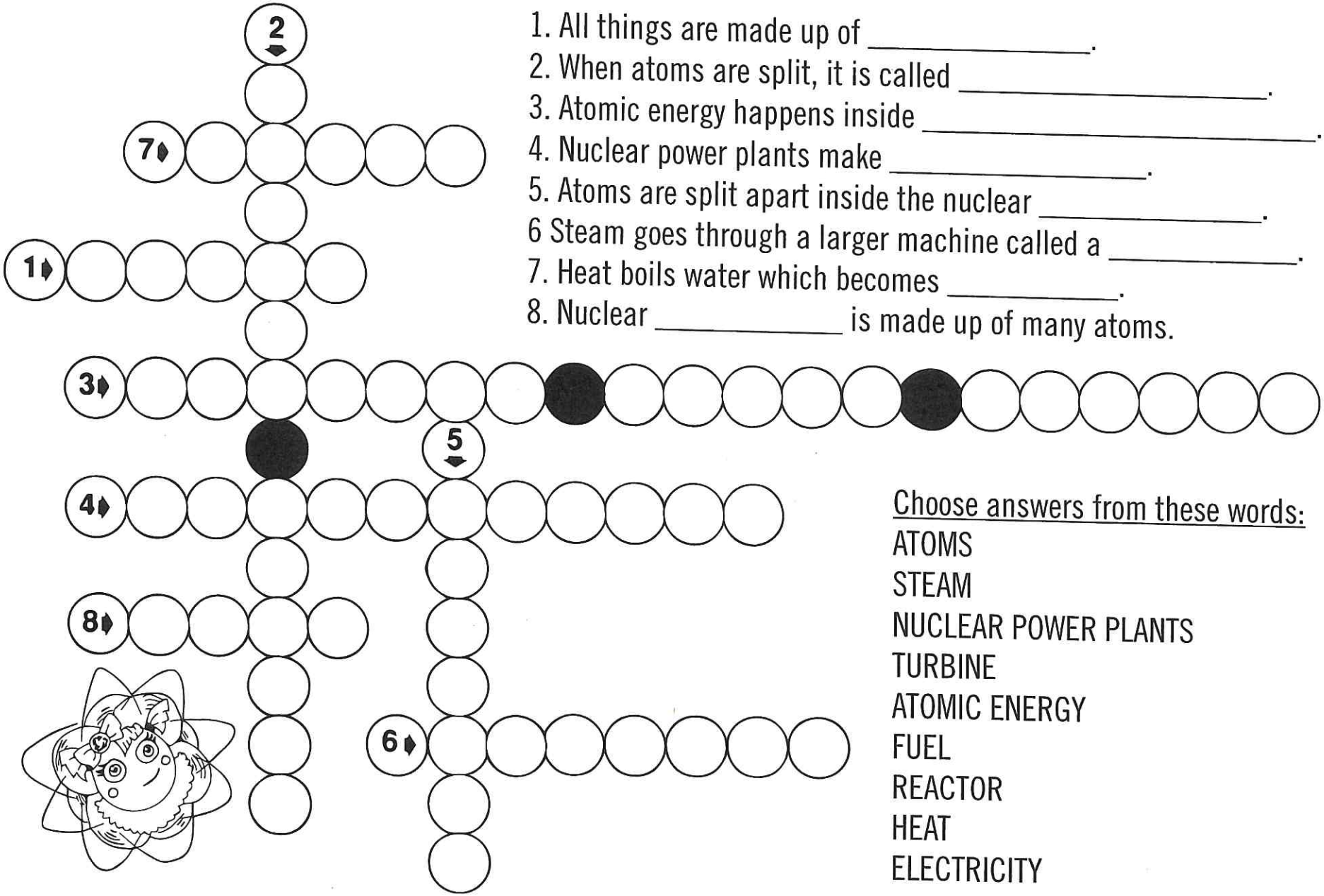
Fill in the sentences with missing words, then solve the puzzle

1. All things are made up of _____.
2. When atoms are split, it is called _____.
3. Atomic energy happens inside _____.
4. Nuclear power plants make _____.
5. Atoms are split apart inside the nuclear _____.
6 Steam goes through a larger machine called a _____.
7. Heat boils water which becomes _____.
8. Nuclear _____ is made up of many atoms.



Choose answers from these words:

ATOMS
STEAM
NUCLEAR POWER PLANTS
TURBINE
ATOMIC ENERGY
FUEL
REACTOR
HEAT
ELECTRICITY

Activity completed by: _____

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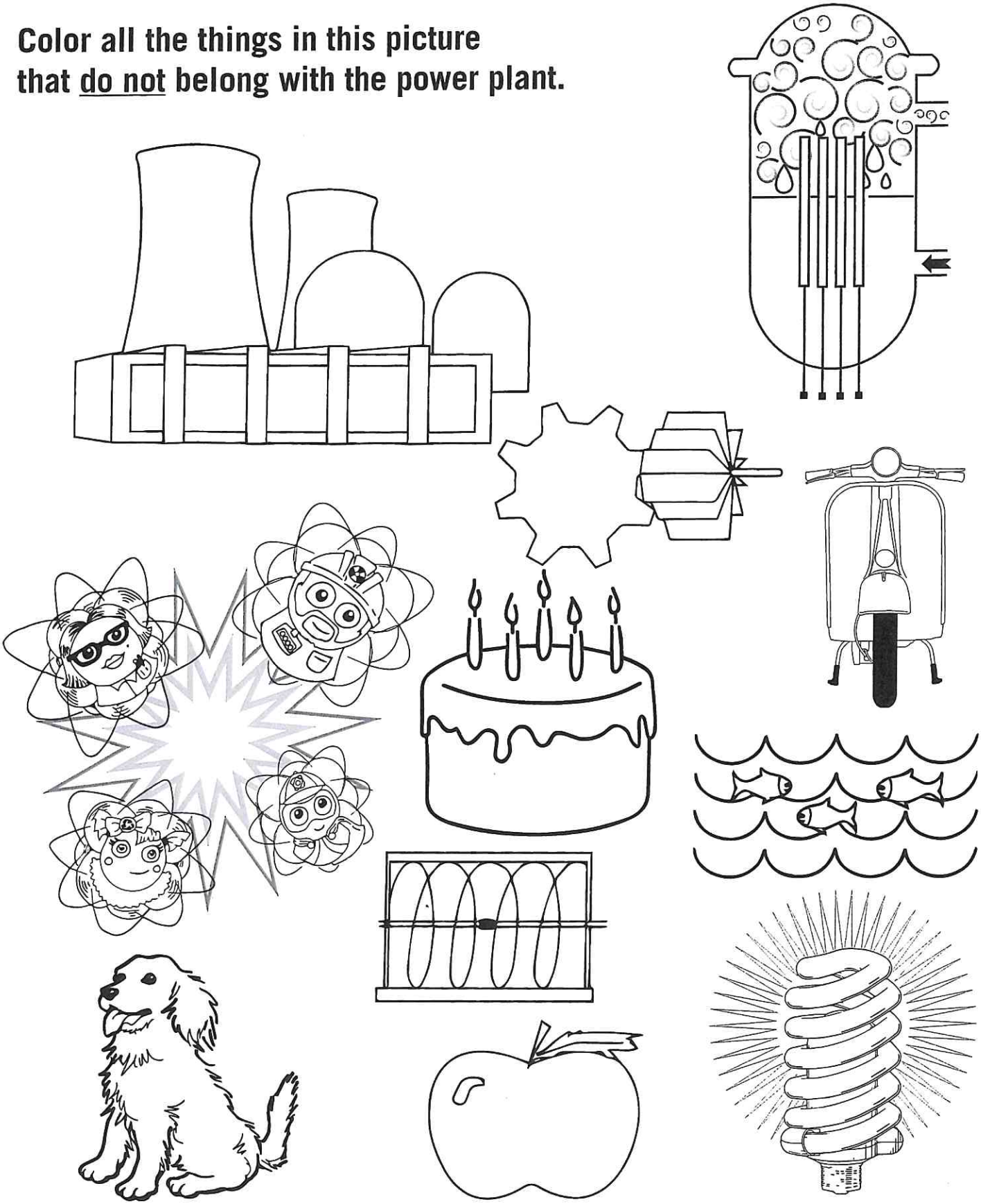
So far we have learned the parts of a nuclear power plant and how we make electricity.

Color all the things in this picture that <u>do not</u> belong with the power plant.



 Activity completed by: _____

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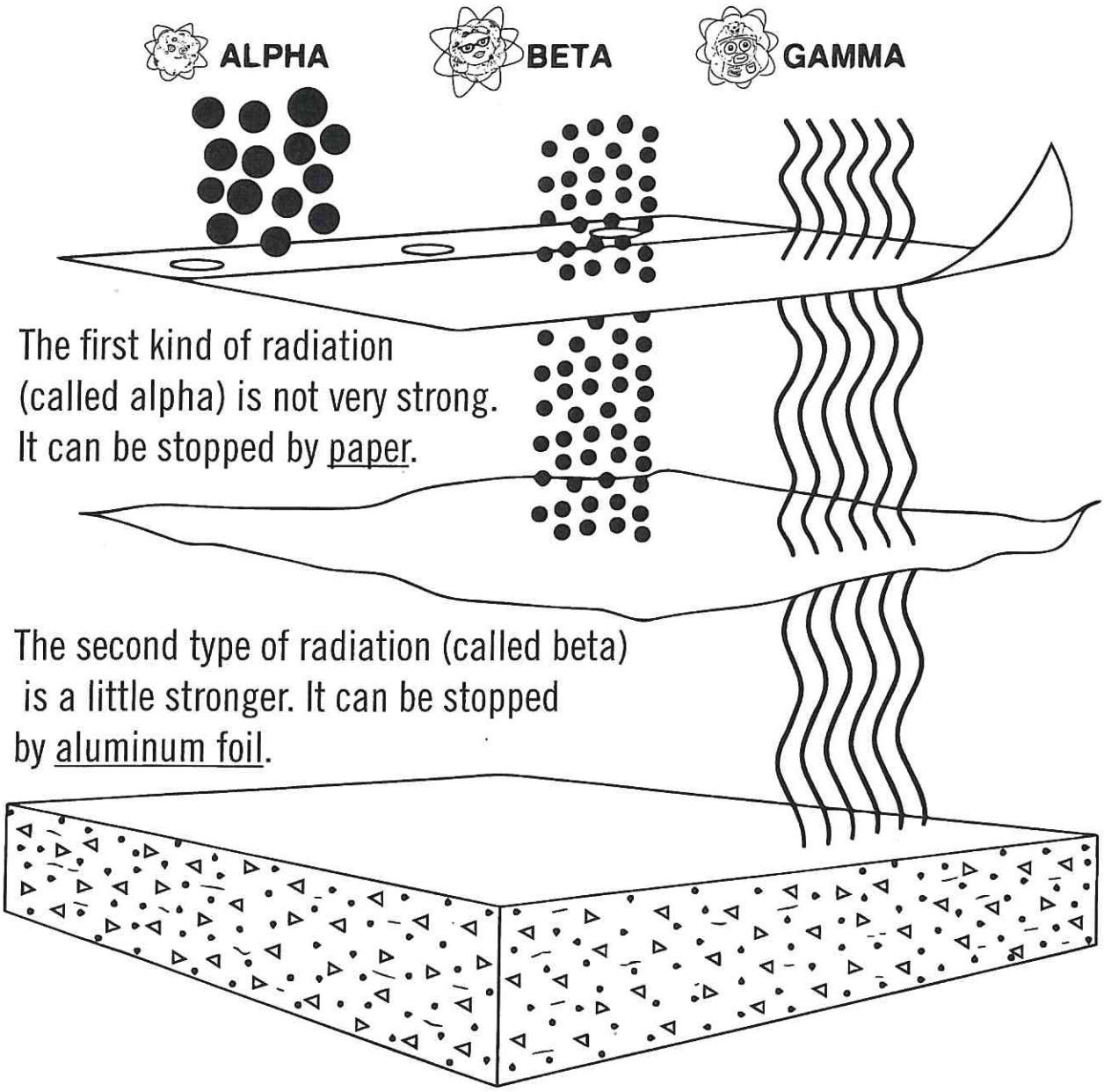
Some atoms - - like the ones in nuclear fuel - - give off energy that cannot be seen. They just do this naturally. This energy is called RADIATION.

There are three common kinds of radiation energy. Each has a different ability to go through materials and does different kinds of work.



The third kind of radiation (called gamma) is even stronger. It can be stopped by thick concrete.

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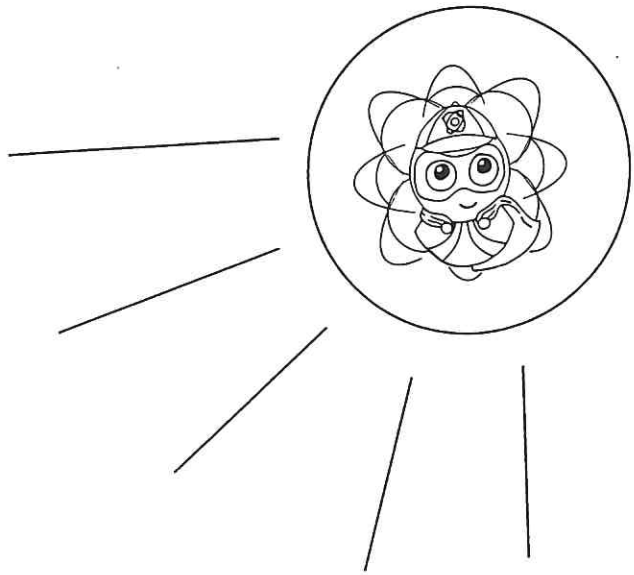
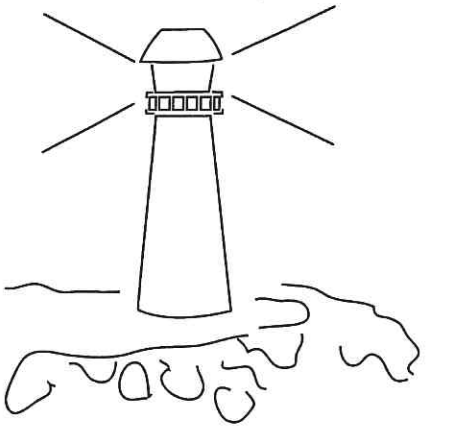
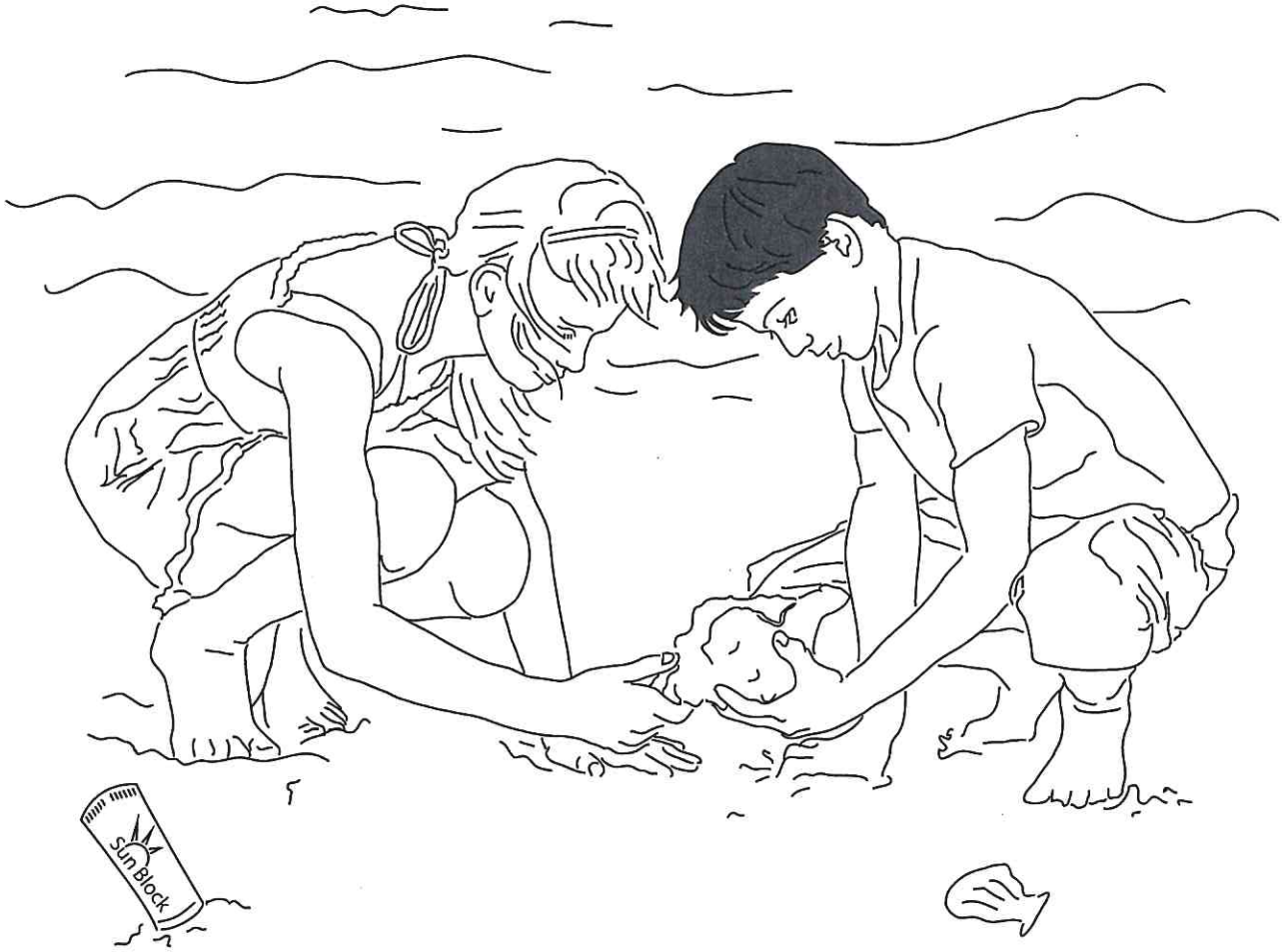
The sun gives off one kind of radiation.
It helps plants and trees grow.
But too much radiation can hurt us.
We need protection, called SHIELDING.





To protect ourselves from too much sunlight,
we use sun block or wear clothes as shielding.
We also reduce our time in the sun.



Color this picture and describe which things are helping to shield the children from the sun's radiation.

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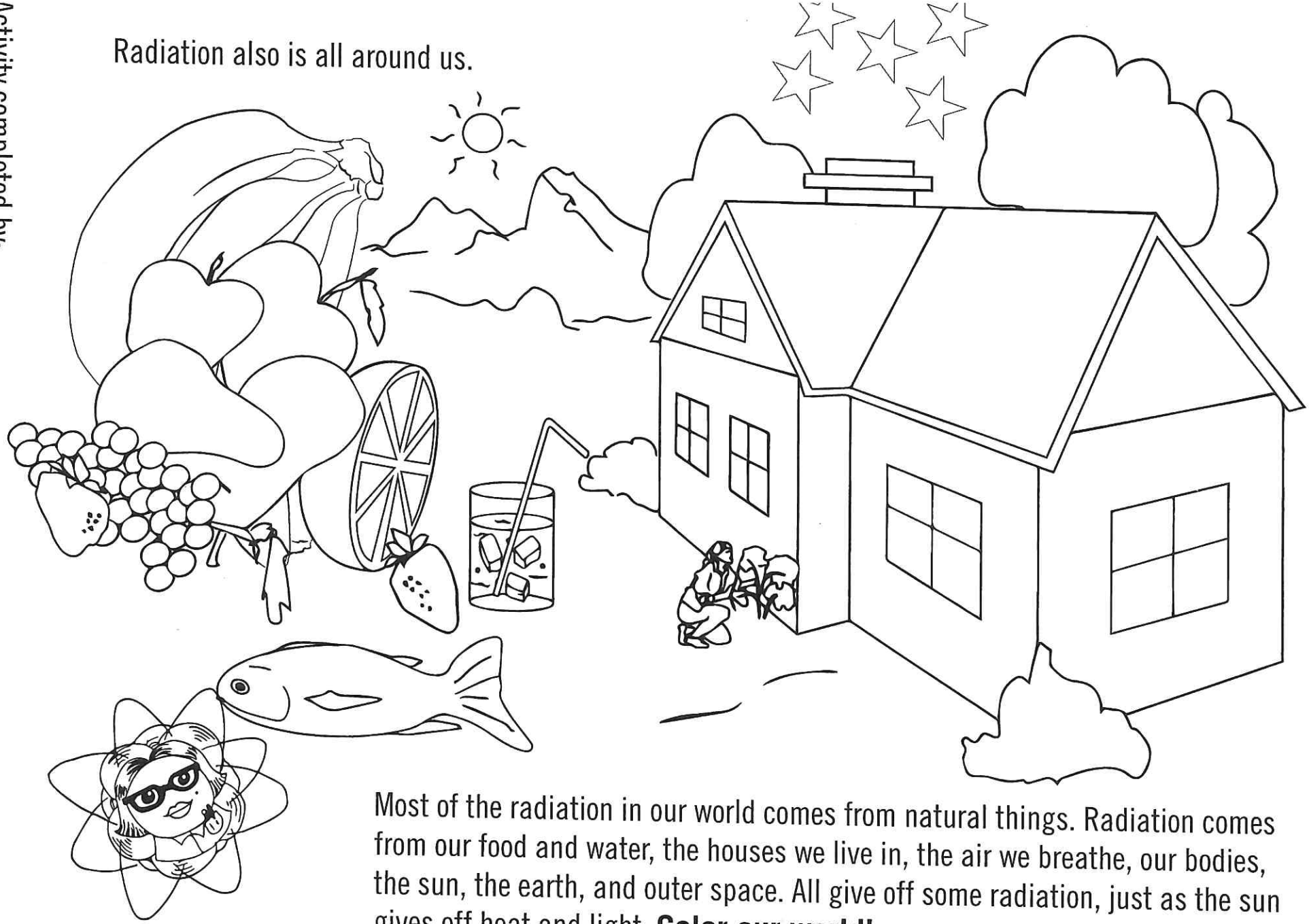
Radiation also is all around us.



Most of the radiation in our world comes from natural things. Radiation comes from our food and water, the houses we live in, the air we breathe, our bodies, the sun, the earth, and outer space. All give off some radiation, just as the sun gives off heat and light. **Color our world!**

Activity completed by: _____

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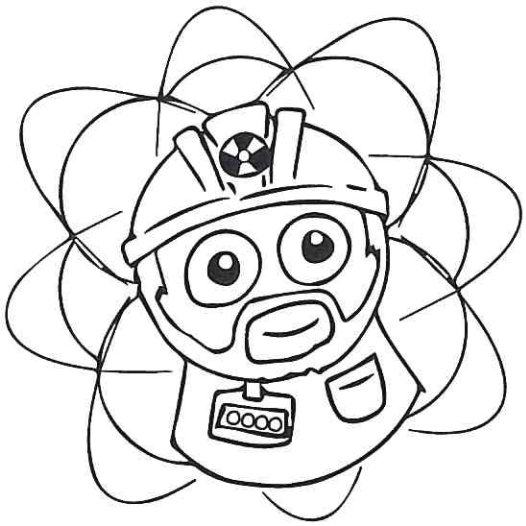
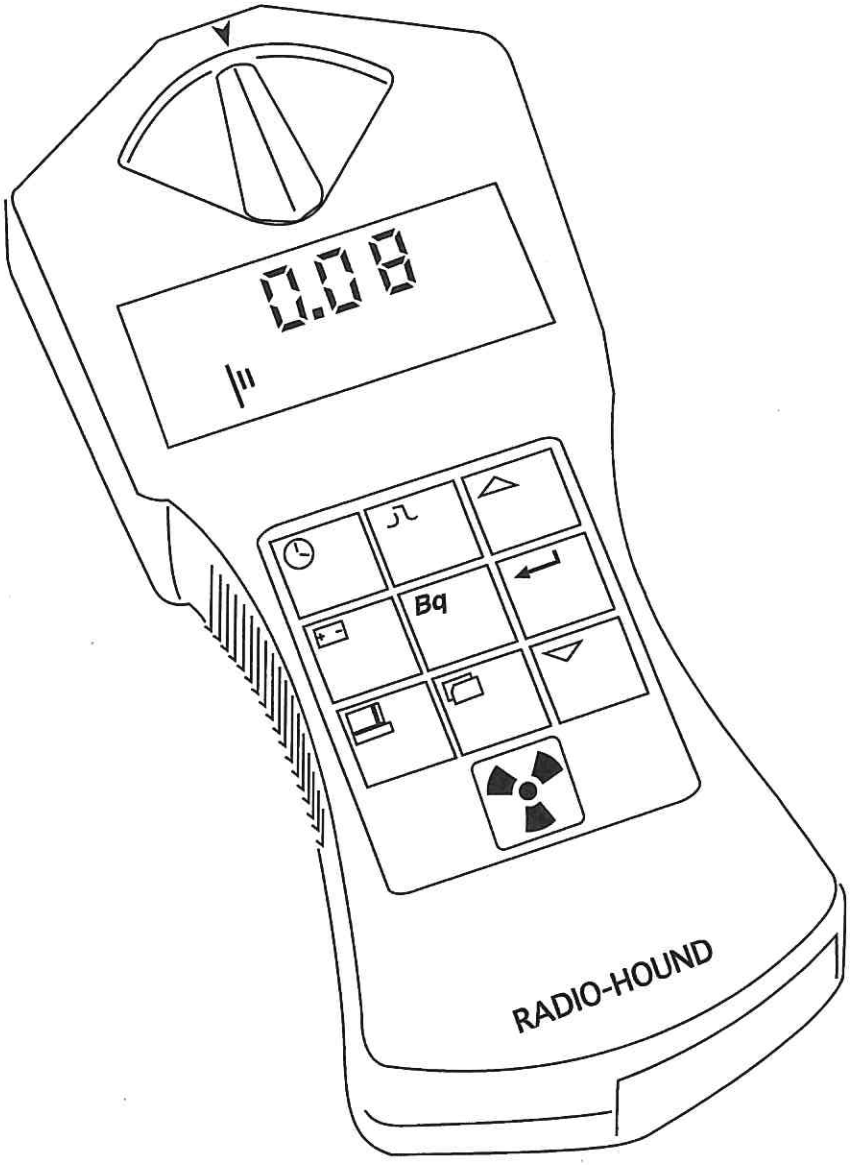
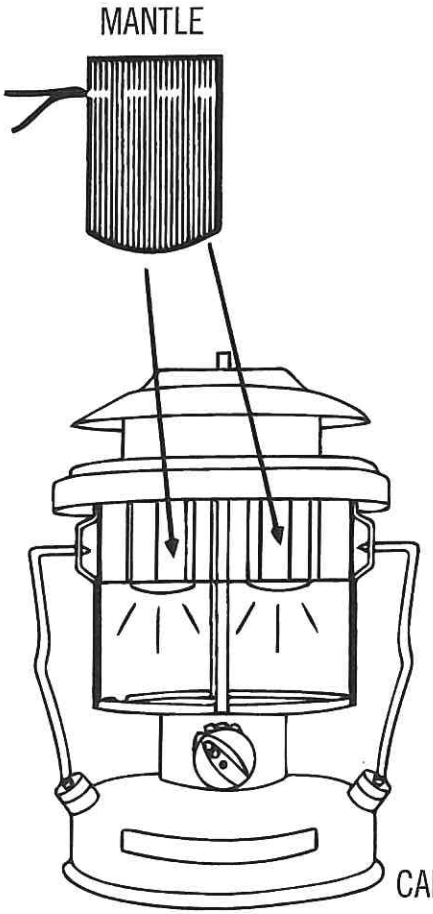
Radiation can be measured using something called a GEIGER COUNTER.







For example, the mesh bags or mantles that are burned inside a camping lantern for light give off a small amount of radiation energy. A Geiger counter will click when placed near one of these bags to tell us it is giving off radiation and is RADIOACTIVE. (The lantern itself shields us from some of this radiation.)

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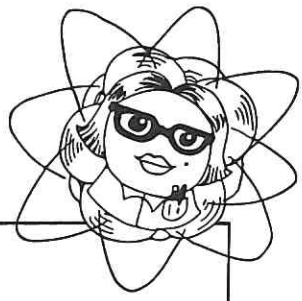
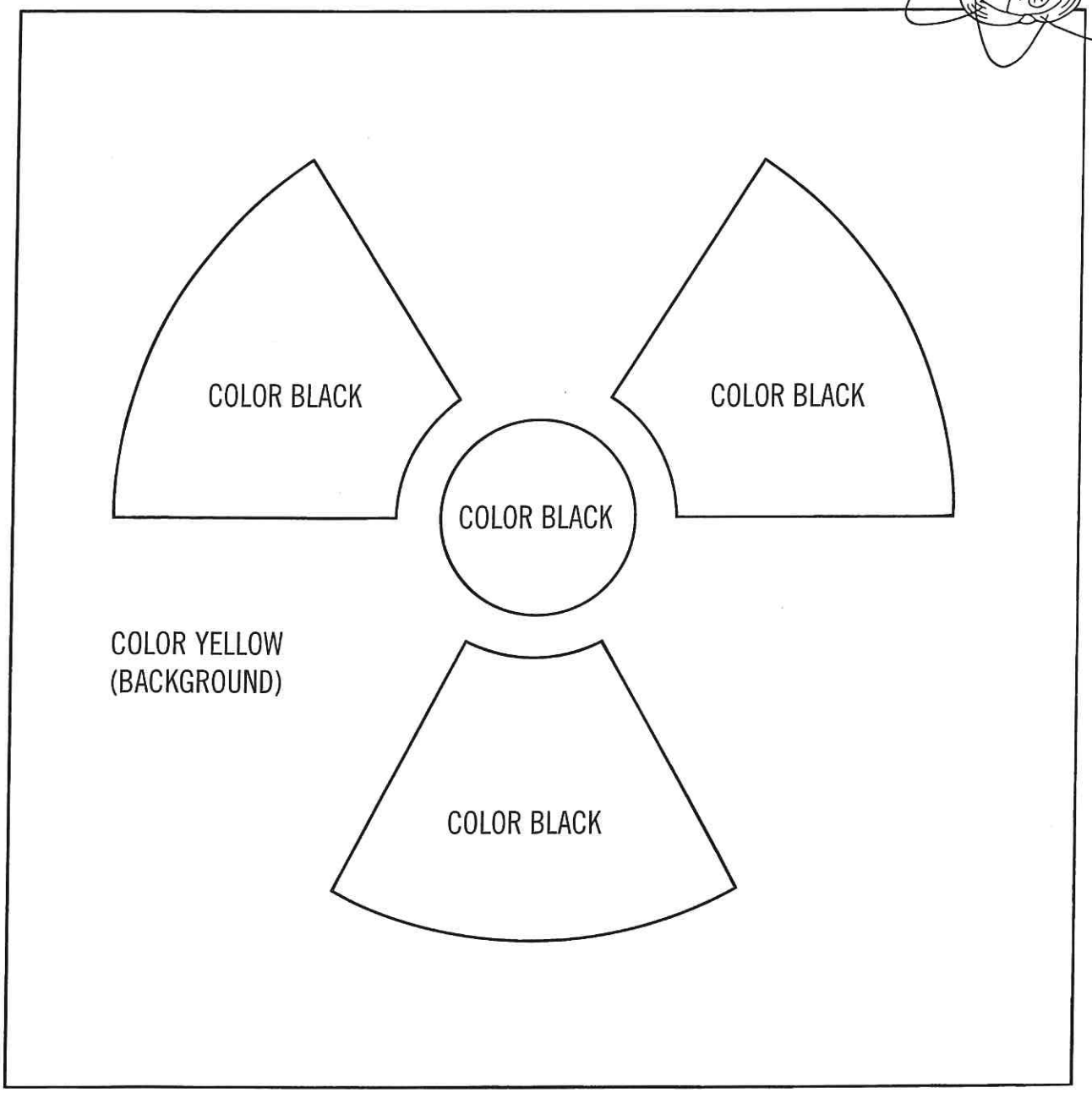
This picture is a label put on many things and places where there is stronger radiation.





Color the picture as marked above.

This label is always colored BLACK, on a YELLOW background. You should not touch or go into places marked with this label.

Activity completed by: _____

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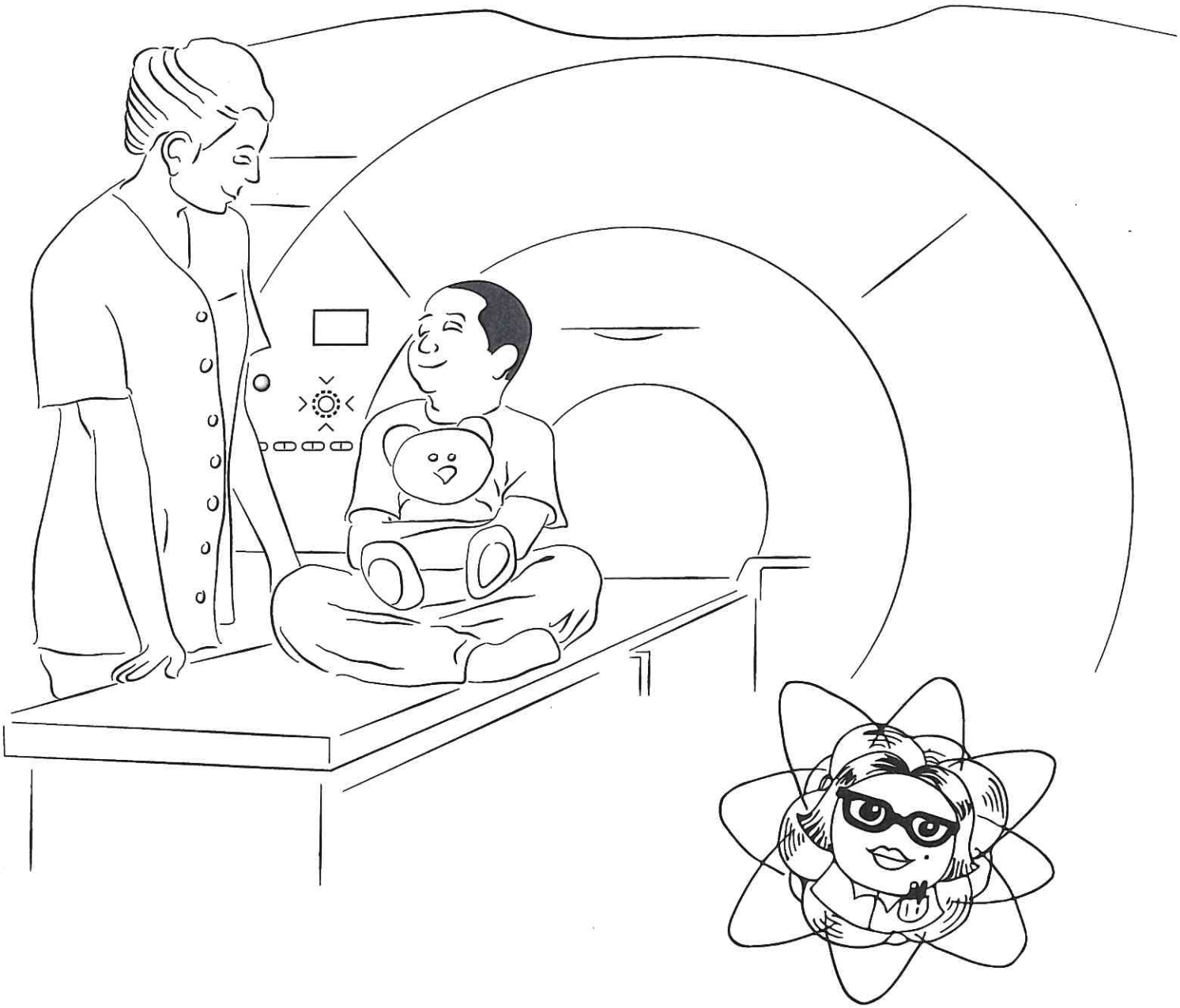
Atoms that give off radiation energy are called RADIOISOTOPES. Radioisotopes can be used to do many things besides making electricity.



For example, sometimes radioisotopes in medicine are put into your body to treat illness. They can also help doctors take pictures of what's happening inside your body. The radioisotope can be measured or TRACED as it goes through your body.

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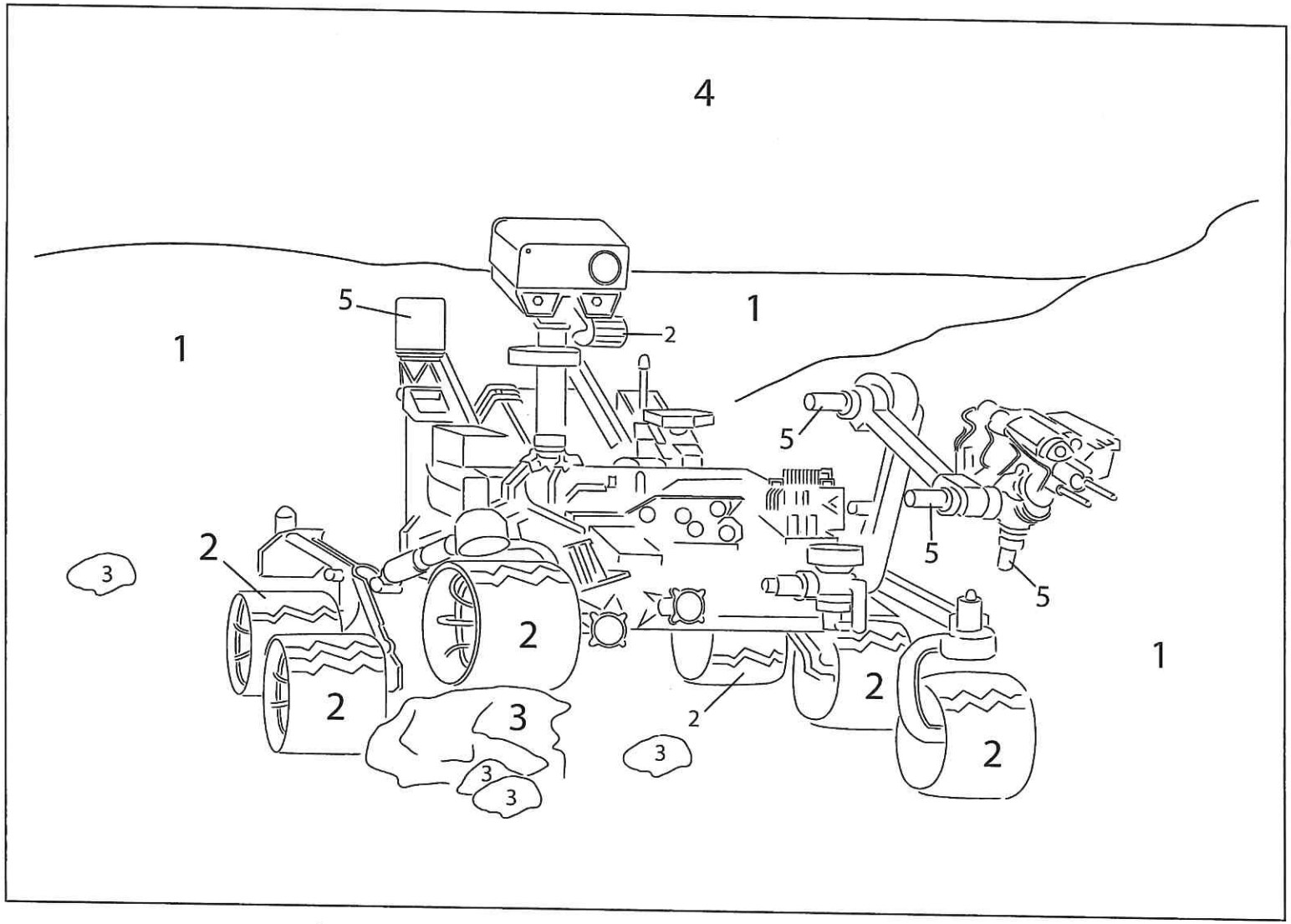
Radioisotopes are used to heat and power the Curiosity Rover, while it studies rocks and soils on Mars.



Color the picture using the numbers. What do you see?

1 - brick red
2 - grey
3 - brown
4 - dark blue
5 - orange

Activity completed by: _____

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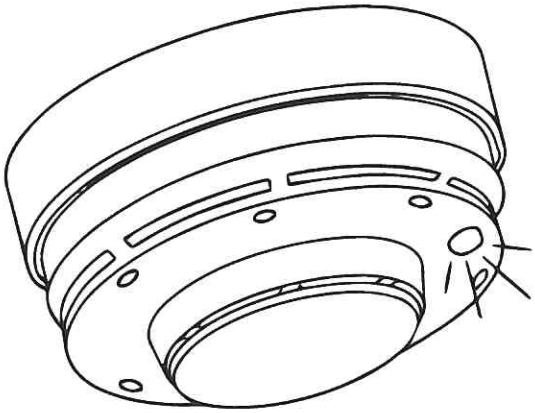
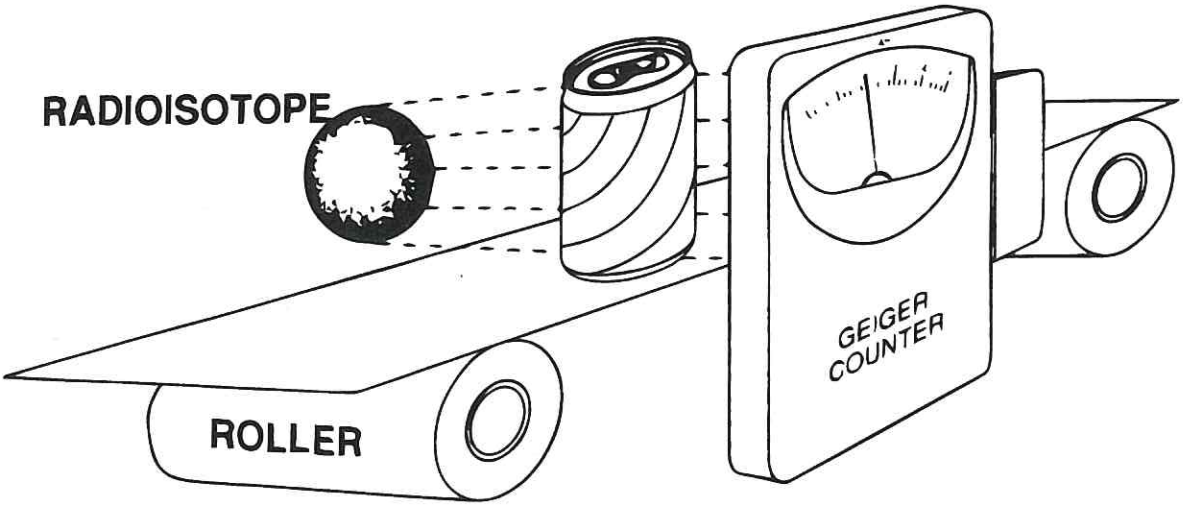
Another radioisotope is used in SMOKE DETECTORS.
Smoke detectors protect us and our homes.



The radioisotope in a smoke detector helps to sense when there is smoke and heat.
The detector warns us with a loud buzzing noise.



Radioisotopes also are used to measure and control how much soda pop is in a can, or how thick paper is as it is being made.

Radiation is used to make non-stick frypans, too!
(But it does <u>not</u> make the pan radioactive)

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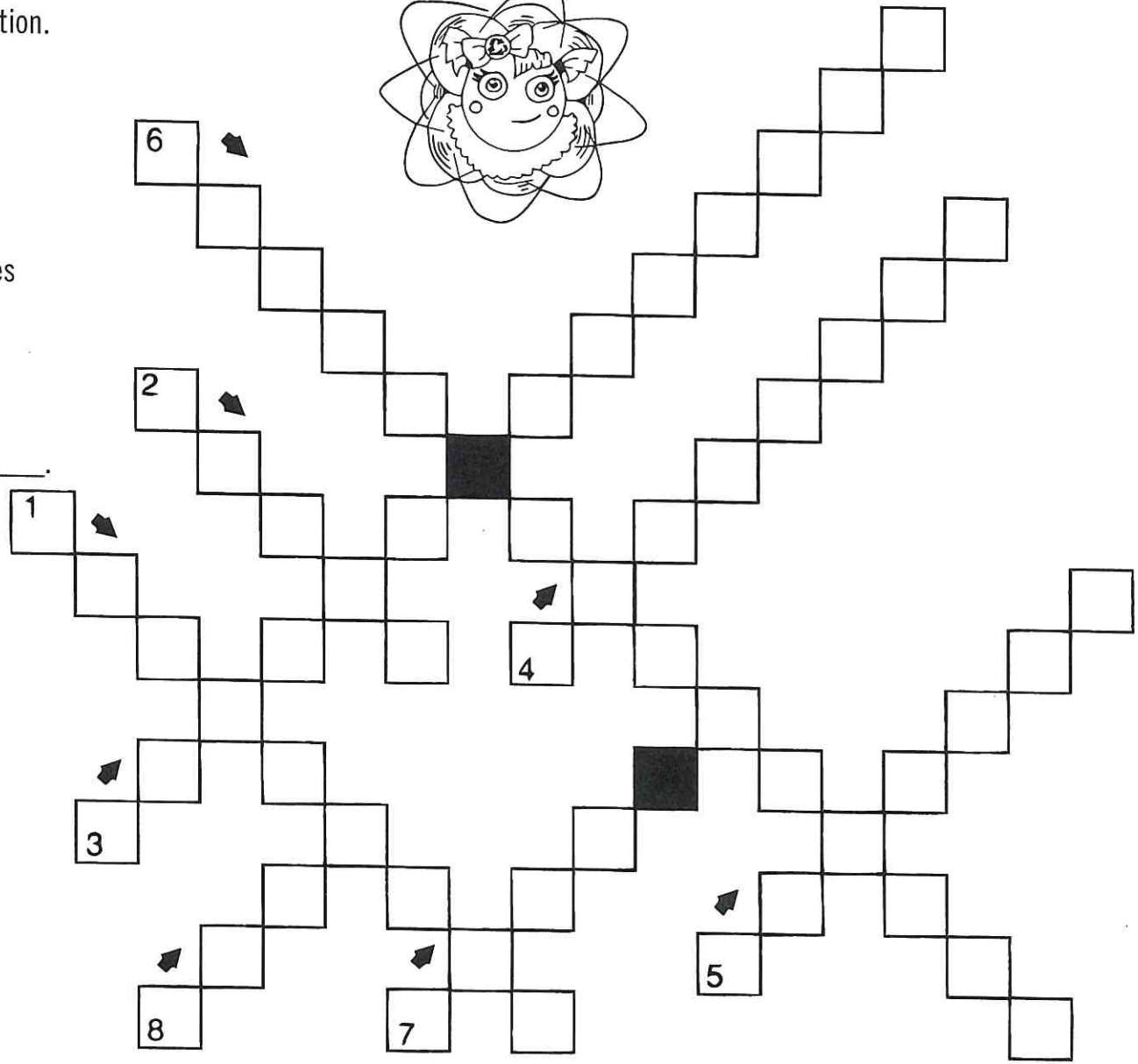
Activity completed by: _____

Fill in the sentences and then solve the puzzle.

1. Some atoms give off energy we cannot see called _____
2. There are _____ kinds of radiation.
3. Radiation can be measured using a _____ _____.
4. Some radioisotopes are used in _____ to treat illnesses.
5. Most of the radiation in our world comes from _____ things.
6. Another radioisotope is used in _____ _____
7. Smoke detectors protect the _____.
8 Radiation can _____ you if you get too much of it.



Choose the answers from these words:

RADIATION
HURT
NATURAL
THREE
GEIGER COUNTER
HOME
SMOKE DETECTORS
MEDICINE

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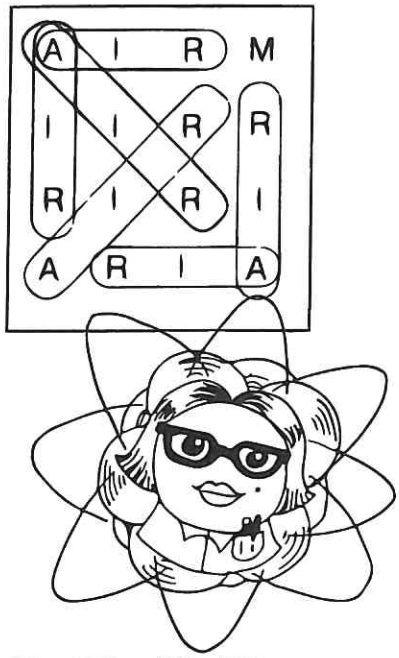
Find the words and circle them.
(Some words are used more than once.)



RADIATION
GEIGER COUNTER
MEDICINE
NATUAL
FOOD
WATER
HOMES
AIR
BODIES
OUTER SPACE
GROUND
SMOKE DETECTOR
RADIOISOTOPES
PROTECTION
SHIELDING
ILLNESS
SUN

G A S M O K E D E T E C T O R
H E R T M S G R O U N D I O A
O Q I L L N E S S E S O M A D
M M A G R A P A C E M B E I I
E O L M E D I C I N E M N R O
S N S M O R H M O D M L O U I
N A I H M L C L O B O D I E S
O T M O I M H O M E M T T N O
I U G Y D E N A U M R O A O T
T R M R M I L H Z N E Y I I O
C A W I O L S D M L T M D T P
E L Z A M U M T I M A E A A E
T N K O C I N S A N W M R I F
O U M L M O R D M N G M Y D O
R S O U T E R S P A C E M A O
P R C D I Q A C L I V E K R D

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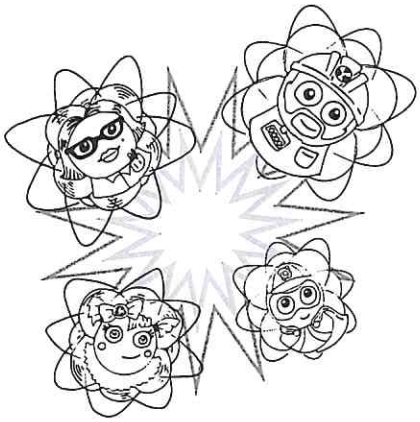
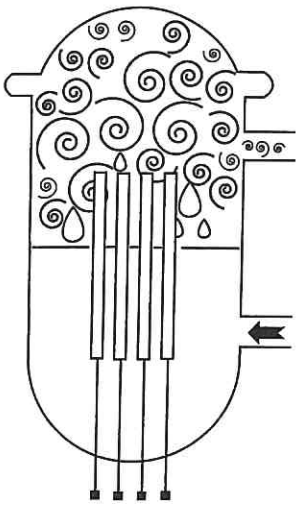
Let us see what we have learned.

Draw a line to match the pictures with the correct words.

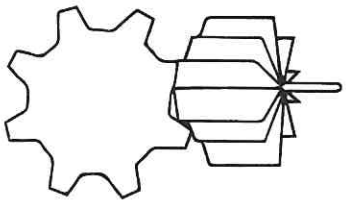


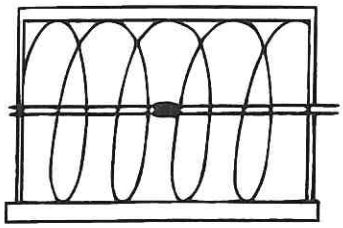
TURBINE



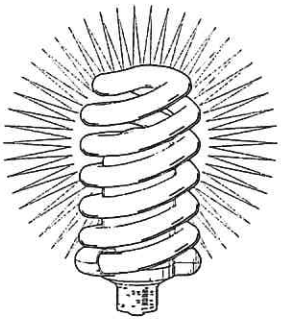
GENERATOR

USE OF ELECTRICITY





THE ATOMS FAMILY



NUCLEAR REACTOR

Activity completed by: _____

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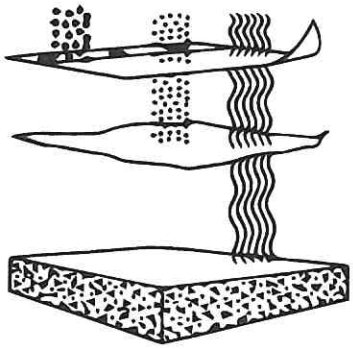
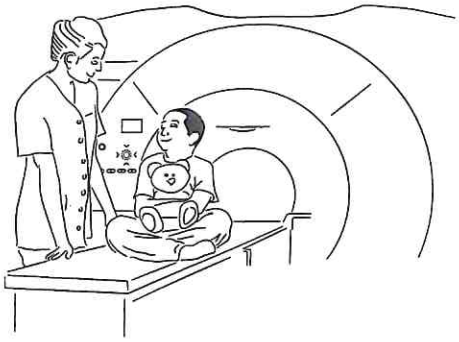
Match the pictures with the correct words.

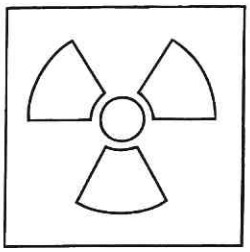


LABEL THAT MEANS RADIATION

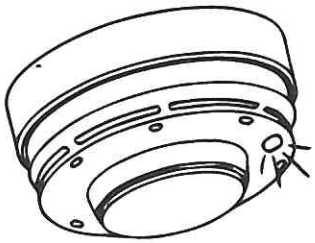


SMOKE DETECTOR

RADIATION



GEIGER COUNTER



RADIOISOTOPE IN MEDICINE

 Activity completed by: _____

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Unscramble the words.

1. _____
   SOATM
   Everything in our world is made up of these tiny pieces.

2. _____ _____
   EOATMCIGYRNE
   When some atoms are split, their pieces move away from each other very fast, making this.

3. _____ _____
   ACREORTCLUNAER
   This is an important part of the nuclear power plant.

4. _____
   DARTIAOIN
   Some atoms give off this energy, which we cannot see.

5. _____ _____
   RTCENUOREGIEG
   Radiation can be measured by this.

6 _____ _____
   MOSEKTCEDTERO
   It warns us when there is smoke and heat.

7. _____
   LECRTYITECI
   We get it in our homes from nuclear power plants.

8. _____
   DIOAROISTEPO
   It is used in medincine to treat illnesses.

9. _____
   TUNALRA
   Most radiation is this kind, not from nuclear reactors

10. _____
   HDISELING
   If you are outside in the strong sunlight, use sun lotion on your skin for this.

Activity completed by: _____

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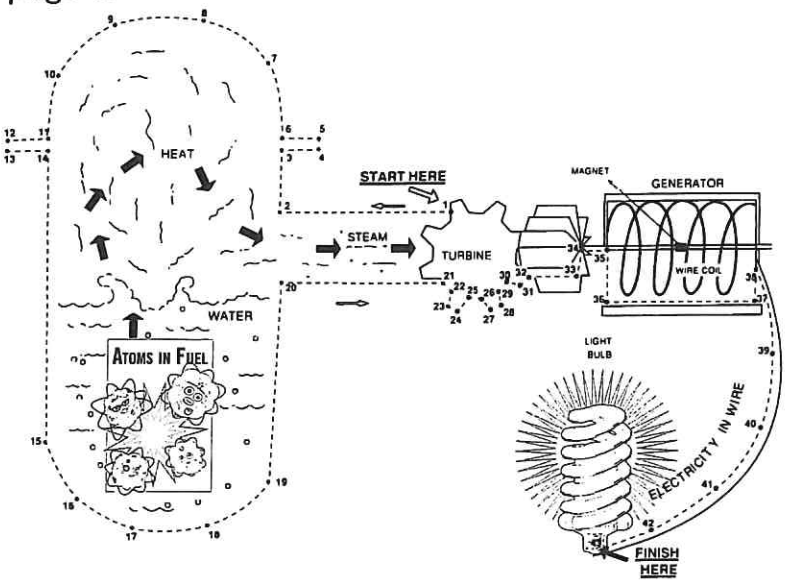
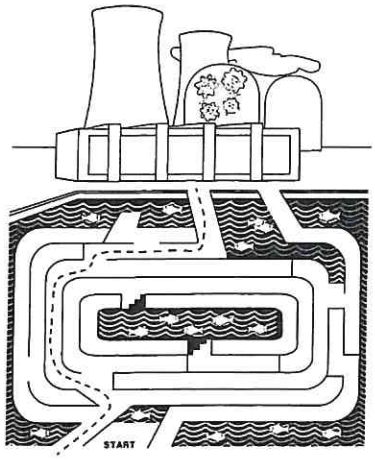
Answers

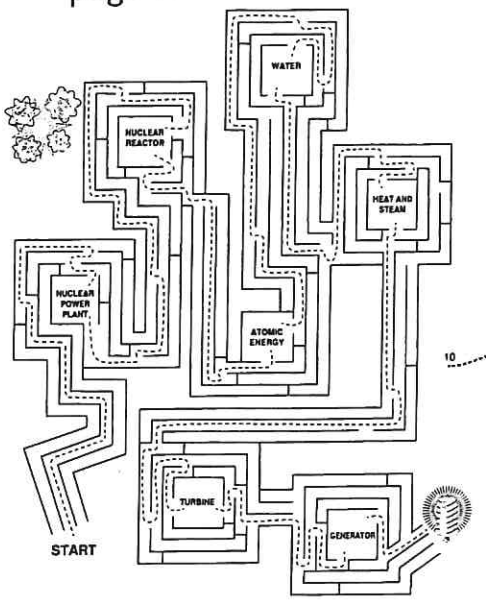
page 3:



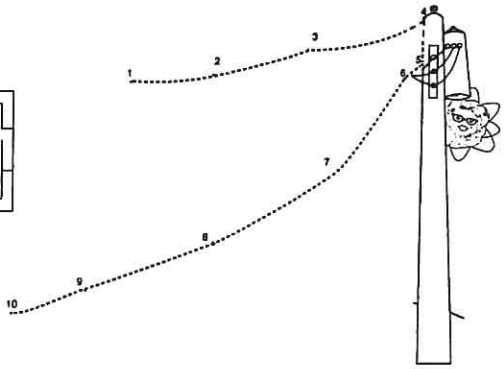
page 6:



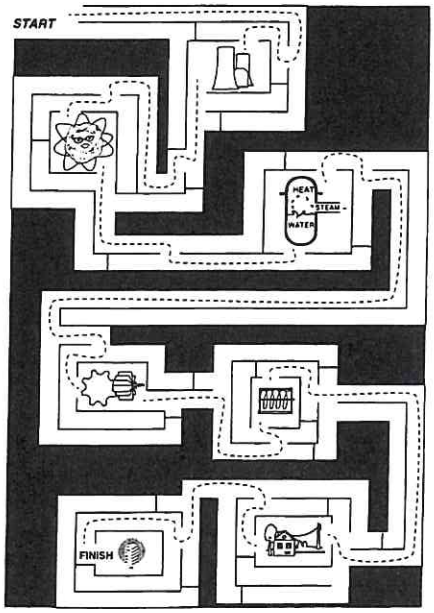
page 7:



page 8:



page 9:



page 10: 6 things need electricity to work – refrigerator, clock, ceiling lights, stove, dishwasher, mixer

page 11:
1. atoms
2. atomic energy
3. nuclear power plants
4. electricity
5. reactor
6. turbine
7. steam
8. fuel

page 12: These things do not belong with the power plant: dog, scooter, apple

page 16: Clothes and suntan lotion protect the children

page 21:
1. radiation
2. three
3. Geiger counter
4. medicine
5. natural
6. smoke detectors
7. home
8. hurt

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page 22:

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GASMOKEDETECTOR
HERTMSGROUNDIOA
OQILLNESSESOMAD
MMAGRAPACEMBEII
EOLMEDICINEMNRO
SNSMORHMODMLOUI
NAIHMLCLOBODIES
OTMOIMHOMEMTTNO
IUGYDENAUMROAOT
TRMRMILHZNEYIIO
CAWIOLSDMLTMDTP
ELZAMUMTIMAEAAE
TNKOCINSANWMRIF
OUMLMORDMNGMYDO
RSOUTERSPACEMAO
PRCDIQACLIVEKRD
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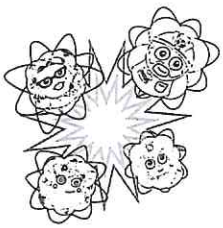
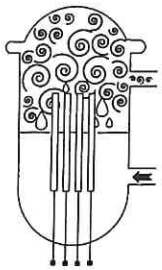
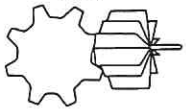
page 23:



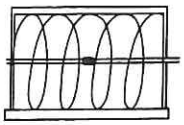
the Atoms Family



nuclear reactor



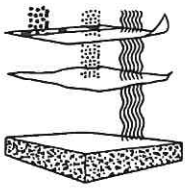
turbine



generator

use of electricity

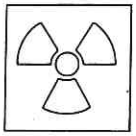
page 24:



radiation

radioisotopes in medicine

Geiger counter



label that means radiation

smoke detector

page 25:

1. atoms
2. atomic energy
3. nuclear reactor
4. radiation
5. Geiger counter
6. smoke detector
7. electricity
8. radioisotope
9. natural
10. shielding

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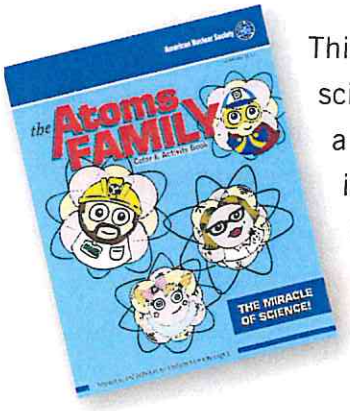
What You Will Learn



This booklet tells part of the Atoms Family story. There is even more to learn if **you** like science you might become an engineer (someone who finds ways to solve problems) or a scientist when you grow up. **YOU** might be the person who helps make electricity in a power plant or who helps sick people or who finds new ways to use radiation to solve problems in our daily lives or who helps to make our world a cleaner, safer place by finding new ways to dispose of wastes left from the fuels used to make electricity of from medical and industrial uses of the atom.

Using this booklet, as a supplemental learning activity, children from kindergarten to fifth grade can:

- Learn that everything is made of atoms.
- Learn that electricity must be **made**; and how it is made in a nuclear power plant.
- Learn that radiation energy is all around us, and that it can be measured even though it cannot be seen.
- Learn several ways that radiation (from radioisotopes) helps us every day.
- Learn that radiation may hurt us, but that we can protect ourselves from this by shielding.

*"You and your family can learn even more about nuclear science and technology by visiting **www.nuclearconnect.org**. Log on to play games, find experiments you can do at home or school, and much, much more!"*

American Nuclear Society

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