



## BACKGROUND FOR TEACHERS

Sunlight is necessary for the existence of humans, plants, and animals. The sun supplies energy in the form of light and heat which is needed by all living things. The sun provides light which helps grow the food that you eat and the trees that help produce the oxygen that you breathe. The heat from the sun provides warmth which keeps you from freezing. The sun also helps your body make its own Vitamin D which is an important nutrient in the development of strong, healthy teeth and bones. Without the sun, life would not exist.

However, the sun's rays also can be harmful. The sun can create unbearable heat causing the evaporation of water sources, disintegration of materials, and even thirst and dehydration of plants, animals, and humans. Sunlight can fade things, burn leaves on plants, and make surfaces too hot to touch. Overexposure to the sun also can damage skin and eyes.

The sun has three types of ultraviolet (UV) rays. The shortest rays (waves), called UVC, do not reach the Earth. The ozone layer of the Earth's atmosphere shields the Earth to keep out UVC. The medium-length waves, called UVB, and the longer UVA waves reach the Earth's surface. UVA and UVB rays are the ones that can damage skin and eyes.

The amount of sunlight you receive depends largely on the season, climate, and the area of the world in which you live. You are exposed to varying amounts of UVA and UVB. Because of the tilt of the Earth on its axis, UV light is more intense in summer months and less intense in winter months. Areas that have clear, sunny weather receive more UV exposure than do areas that have more cloudy, rainy weather. However, you can still damage your skin in cloudy weather since about 70 percent of the UV rays penetrate the clouds and reach the Earth's surface. Sunlight is more intense at locations closer to the equator since the sun's rays hit the Earth at a direct angle. The farther away from the equator you are, the more dispersed the sun's rays and thus, the less intense the sunlight. The sun's rays also are more intense at higher elevations since they are closer to the sun.

Your skin is a very complex organ that provides your body with a sensory bridge to the world. The largest organ in the body, the skin helps regulate body temperature. When your body gets too hot, you begin to sweat through your skin. This lets the body release some of its heat which decreases body temperature. The nerve endings in the skin also help you realize differences in feel. The skin has three main layers: the epidermis, dermis, and subcutaneous (sub-kyoo-ta-ne-ous) layers.

Your risk or chance of skin damage also depends on your skin type (how your unprotected skin reacts when exposed to the sun); your family history of skin cancer; and your behavior (how much time you spend in the sun unprotected). Skin damage can take on several forms, including sunburn, suntan, wrinkles, freckles, precancerous skin conditions or skin cancer. UVB damages the epidermis and can cause sunburn and skin cancer. UVA damages the deeper dermis layer and can cause wrinkles, freckles, a tan, and skin cancer. Eye damage can include cataracts and blindness.

Your natural skin color is inherited from your parents. This color or pigment, called melanin, is found throughout the lower layer of the epidermis. People who have a lot of melanin, such as African Americans, have more natural protection from the sun. Light-skinned Caucasians have much less melanin in their skin. They have less natural protection from the damaging rays of the sun and should be extra careful to practice sun safety.

You are at higher risk of developing skin cancer if other family members have been diagnosed with skin cancer.

It is important to remember that the sun's rays are both beneficial and detrimental. Protecting yourself from the sun is very important.

## UNIT OVERVIEW

This unit focuses on the harmful and helpful effects of the sun, the characteristics of human skin, and the interaction between the sun and skin.

## VOCABULARY

**Skin:** the outer covering that protects the body.

**Sun Safety:** protecting your skin from the sun by finding shade, wearing cover-up clothing, and using sunscreen.

**Sunburn:** what happens when you stay out in the sun too long. Too many of the sun's rays reach your body and burn your skin.

**Freckles:** small, brown patches of color in the skin that are caused by exposure to the sun.

**Moles:** small, dark, slightly raised patches of skin.

## ACTIVITY SYNOPSIS

### *Setting The Stage*

- **1.1 Our Body Sends Us Messages!**  
Students explore sunburns as the body's alarm that it is getting too much sun.

### *Learning Activities*

- **1.2 A Closer Look at Skin**  
Students take a closer look at skin characteristics, eye color, and hair color and record their class statistics on simple bar graphs.
- **1.3 Fading C.J.**  
This experiment illustrates how sunlight changes the physical properties of an object. Students discuss the helpful and harmful effects of the sun.

### *Wrapping It Up*

- **1.4 Sun and You**  
Students review the main points stressed in this unit.

### *Assessing Student Learning, Unit 1*

- **1.5 Sun and You Secret Decoder**  
Students use a secret decoder to review key terms.

## *Setting The Stage*

### **1.1 OUR BODY SENDS US MESSAGES!**

#### **ACTIVITY SYNOPSIS**

Students explore sunburns as the body's alarm that it is getting too much sun.

#### **LEARNING OUTCOMES**

After this activity, students will be able to:

- Recognize a sunburn as one of the body's most important warning signals.

#### **ACTIVITY**

As an introduction to this unit, begin a discussion by asking students about sunburns.

- What is a sunburn?
- Has anyone ever had a sunburn?
- What does a sunburn look and feel like? (Your skin turns red, feels hot, and hurts when you touch it. Sunburned skin also can blister and peel.)
- What does it mean when you have a sunburn? (It means that you have had too much sun. Your skin is trying to tell you that you've been in the sun for too long).
- What are some other ways that your body tells you that something is wrong? (Your stomach aches when you're sick. Your stomach growls when you're hungry. Your arm hurts when you get hit.)
- What are some other ways that your skin sends you messages? (You get goose bumps when you're cold. It hurts when you touch something hot or sharp. It sweats when you're hot.)

Explain to students that it is not healthy to get a sunburn and that's why we're going to learn about being safe in the sun. We will also learn ways to protect our bodies from the sun!

#### **ACTIVITY 1.1**

##### **Supplies Provided**

- None

##### **Supplies Needed**

- None

##### **Approximate Time**

- 10 minutes

##### **Preparation**

- None

## Learning Activities

### 1.2 A CLOSER LOOK AT SKIN

#### ACTIVITY SYNOPSIS

Students take a closer look at skin characteristics, eye color, and hair color and record their class statistics on simple bar graphs.

#### LEARNING OUTCOMES

After this activity, students will be able to:

- Identify different skin characteristics (freckles, moles, color) that make people unique.
- Identify other characteristics (eye color and hair color) that make people different.

#### ACTIVITY

Tell the students that now they are going to do an exercise with skin. Ask them to describe some of the things your skin does for you. (It protects you by keeping out dirt and water. It helps keep you cool when you are hot. It acts as an alarm when you touch hot or sharp things.)

Tell the students that they are going to do a simple graphing activity. Hand out one copy of Activity Sheet 1.2: A Closer Look at Skin to each student. On the chalkboard, create tables using the following format:

#### Skin Characteristics (Freckles and Moles)

None	Some	A Lot

#### Skin color

Light	Medium	Dark

### ACTIVITY 1.2

#### Supplies Provided

- Activity Sheet 1.2: A Closer Look at Skin (pages 1.2.1-1.2.2)

#### Supplies Needed

- Colored markers
- Chalk, chalkboard

#### Approximate Time

- 20 minutes

#### Preparation

- Make one copy of each page of the activity sheet for each student.

## Eye color

Blue	Green	Brown

## Hair color

Yellow	Red	Brown	Black

Conduct the activity following these instructions:

1. Ask students to take a close look at the skin on their arms. How many students have freckles and moles? Ask students with freckles and moles to stand up and count off. Record the number in the table on the chalkboard and ask students to record the number on the appropriate total line on their activity sheets.
2. Continue by asking students in each category to stand up and count off. Record the totals on the table and activity sheets.
3. After the information has been recorded on the chalkboard, point out the number of different skin types, eye colors, and hair colors there are in the class. Let them know that they are all different because they are all special, and they all need to take care of their bodies. Explain that everyone needs to protect their skin every time they go outdoors, even parents. People with light skin, light colored eyes, and many freckles or moles should be most careful in the sun because their skin burns easily, but it is important for everybody to be safe in the sun!
4. Complete the activity by asking students to color the number of spaces on their bar graphs that correspond with the number of students in each category.

## 1.3 FADING C.J.

### ACTIVITY SYNOPSIS

This experiment illustrates how sunlight changes the physical properties of an object. Students discuss the helpful and harmful effects of the sun.

### LEARNING OUTCOMES

After this activity, students will be able to:

- List the helpful and harmful effects of the sun.
- Identify the sun as a powerful source of light which can change the characteristics of things.
- Describe the relationship between the sun and changes in skin color.

### ACTIVITY

The total time to complete this experiment is two to four days. The first day is for the students to set up their experiments. The remaining days are used to detect any results or changes.

Tell the students that today they are going to talk about the sun. Begin a discussion on the good and bad things the sun does. (Helpful effects of the sun include: warming the Earth so people, plants, and animals can live and grow, and giving light so we can see. Harmful effects of the sun include: melting things like plastic; making things like streets and sidewalks hot; drying out and burning plants; making you thirsty; causing your skin to turn red and hurt. Be sure that sunburn is included in the discussion.) Write their responses on the chalkboard.

Tell them that now they are going to perform an experiment to see just how strong the sun is.

Ask the students to pick a partner to work with. After everyone is paired up, hand out one packet to each team and follow the experiment directions.

1. One team member colors and cuts out the sun-safe clothing (page 1.3.2, wide-brimmed hat, sunglasses, long-sleeved shirt, long pants, shoes). The other member colors and cuts out the not sun-safe clothing (page 1.3.3, sun visor, tank top, shorts).

### ACTIVITY 1.3

#### Supplies Provided

- Activity Sheet 1.3: Fading C.J. (page 1.3.1)
- Template 1.3: Fading C.J. (pages 1.3.2–1.3.3)

#### Supplies Needed

- Glue
- Colored markers
- Scissors
- Dark colored paper
- Chalk, chalkboard

#### Approximate Time

- 20 minutes

#### Preparation

- For this activity, students will be working in teams of two. Prior to the experiment, make team packets containing:
  - Two photocopies of the Activity Sheet 1.3: Fading C.J. (page 1.3.1) on dark colored paper (dark blue, purple).
  - One photocopy of the Template 1.3: Fading C.J. Sun-Safe Clothing (page 1.3.2) on white paper.
  - One photocopy of the Template 1.3: Fading C.J. Not Sun-Safe Clothing (page 1.3.3) on white paper.

Be sure they keep the sun-safe and not sun-safe clothes separate.

2. Tell the students to lightly glue or tape the sun safe clothes on one of the C.J. activity sheets and the not sun safe clothes on the other.
3. Each team should locate a place where the sun-light is bright and tape up their two pictures so the sun hits them directly. Let the sun do its work.
4. After a few days, have the students collect their pictures. Ask them to gently remove the paper clothes from both C.J.s. Has the sun changed the color of C.J.'s unprotected skin? (Yes, the parts of C.J.'s body that were not covered by clothes have faded and changed color.)
5. Have each team compare their two pictures and begin a discussion on how the sun's rays damaged (faded) the area not covered by the paper clothes. Which of the two C.J.s has more faded skin? (The one with the not sun safe clothes.) How does this relate to your skin and how you dress? (Unprotected skin can be damaged by the sun's harmful rays. The sun can change your skin color and cause freckles, a tan or a sunburn. The more clothes you wear that cover your skin, the more your skin will be protected from getting freckles, a tan, or a sunburn.) It is important to protect yourself from the sun's strong rays. Conclude this experiment by telling the students that they will be learning how to protect themselves from the sun.

## *Wrapping It Up*

### **1.4 SUN AND YOU**

#### **ACTIVITY SYNOPSIS**

Students review the main points stressed in this unit.

#### **ACTIVITY**

Briefly summarize by telling the students that it is important to take care of their skin and be careful in the sun. The sun is helpful to us as well as harmful as demonstrated in the fading activity. Read Template 1.4: Sun and You poem to the class. Ask students—as a group or individually—to make up a final stanza for the poem. Write the final stanza on the board or have students write down their final stanza.

#### **ACTIVITY 1.4**

##### **Supplies Provided**

- Template 1.4: Sun and You Poem (page 1.4.1)

##### **Supplies Needed**

- Chalk
- Chalkboard

##### **Approximate Time**

- 10 minutes

##### **Preparation**

- Make one copy of the template for each student to take home (optional).

## *Assessing Student Learning, Unit 1*

### **1.5 SUN AND YOU SECRET DECODER**

#### **ACTIVITY SYNOPSIS**

Students use a secret decoder to review key terms.

#### **ACTIVITY**

Tell the students that they are going to find some important words that they learned from the activities in this unit. For each line on Activity Sheet 1.5, use the decoder grid to find the letters corresponding to each number pair. For example: (1,g) (6,h) (2,f) spells RED.

#### **ACTIVITY 1.5**

##### **Supplies Provided**

- Activity Sheet 1.5: Sun and You Secret Decoder (pages 1.5.1–1.5.2)

##### **Supplies Needed**

- Pencils

##### **Approximate Time**

- 20 minutes

##### **Preparation**

- Make one copy of each page of the activity sheet for each student.

# UNIT 1 ANSWERS



## **1.2 A CLOSER LOOK AT SKIN**

Answers will vary.

## **1.3 FADING C.J.**

Answers will vary.

## **1.4 SUN AND YOU**

Answers will vary.

## **1.5 SUN AND YOU SECRET DECODER**

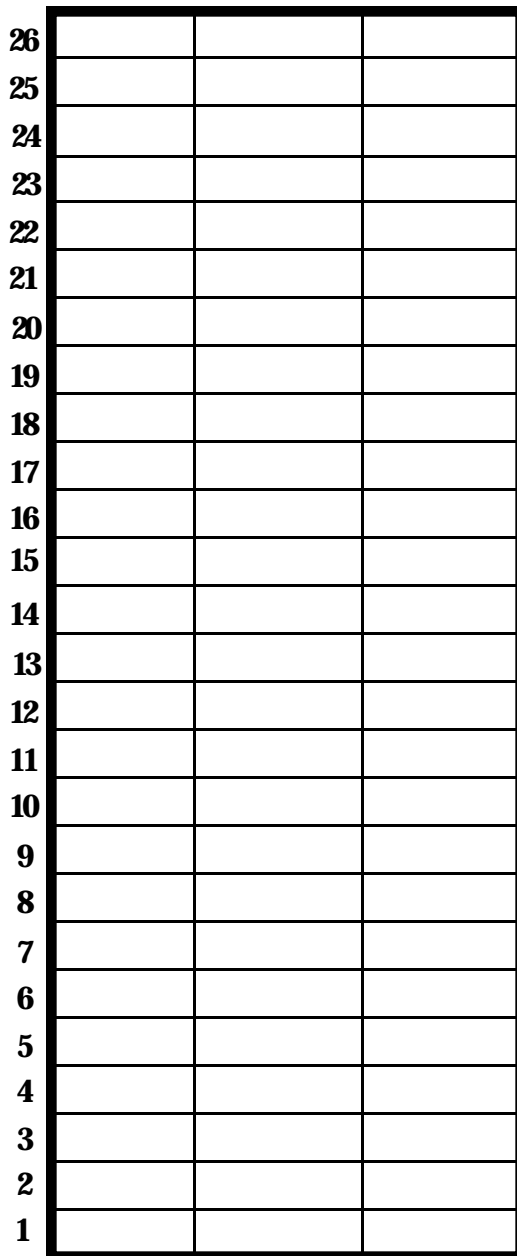
1. Skin
2. Sunburn
3. Sun
4. Fade
5. Light
6. Freckles
7. Sun Safe
8. Spots

Name: \_\_\_\_\_

## 1.2 A Closer Look at Skin

Write the totals for each category in the blanks at the bottom of the graphs. Color the number of spaces to make two bar graphs.

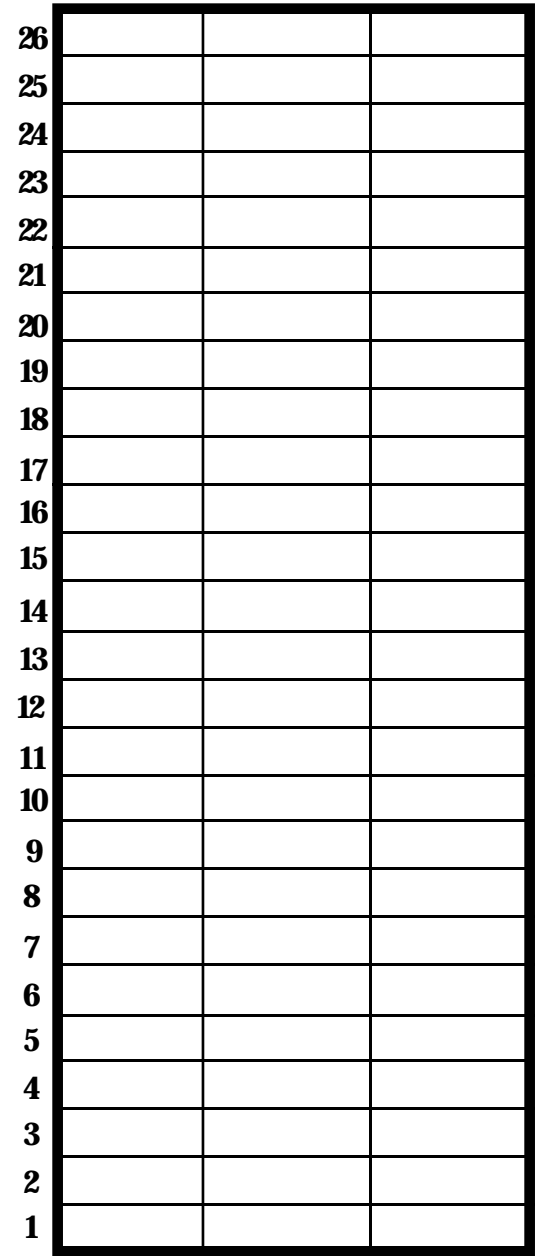
Skin Color



Light Medium Dark

Total \_\_\_\_\_

Freckles and Moles



None Some A Lot

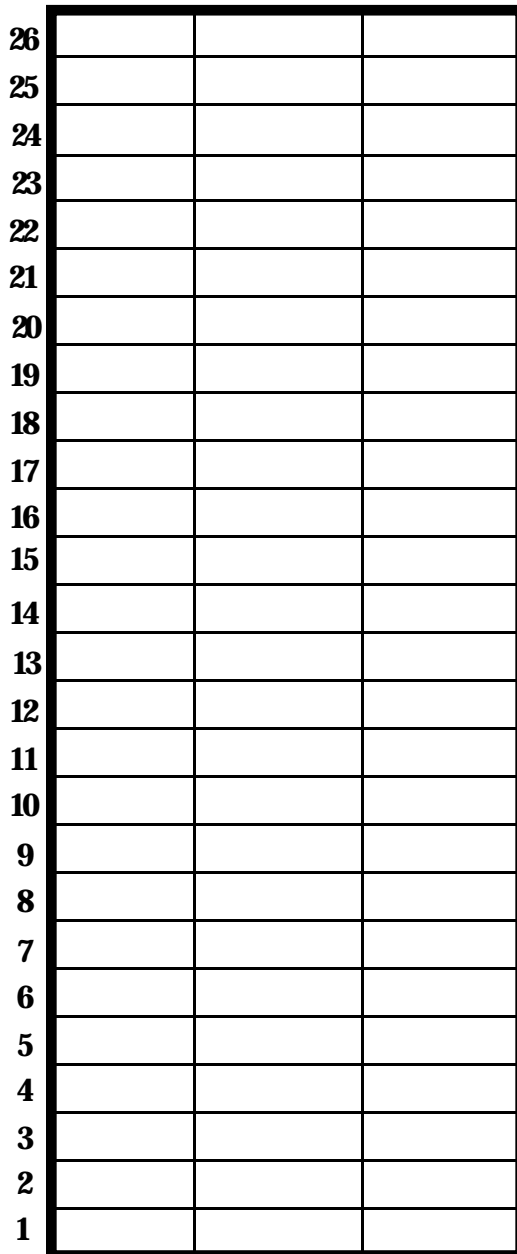
Total \_\_\_\_\_

Name: \_\_\_\_\_

## 1.2 A Closer Look at Skin

Write the totals for each category in the blanks at the bottom of the graphs. Color the number of spaces to make two bar graphs.

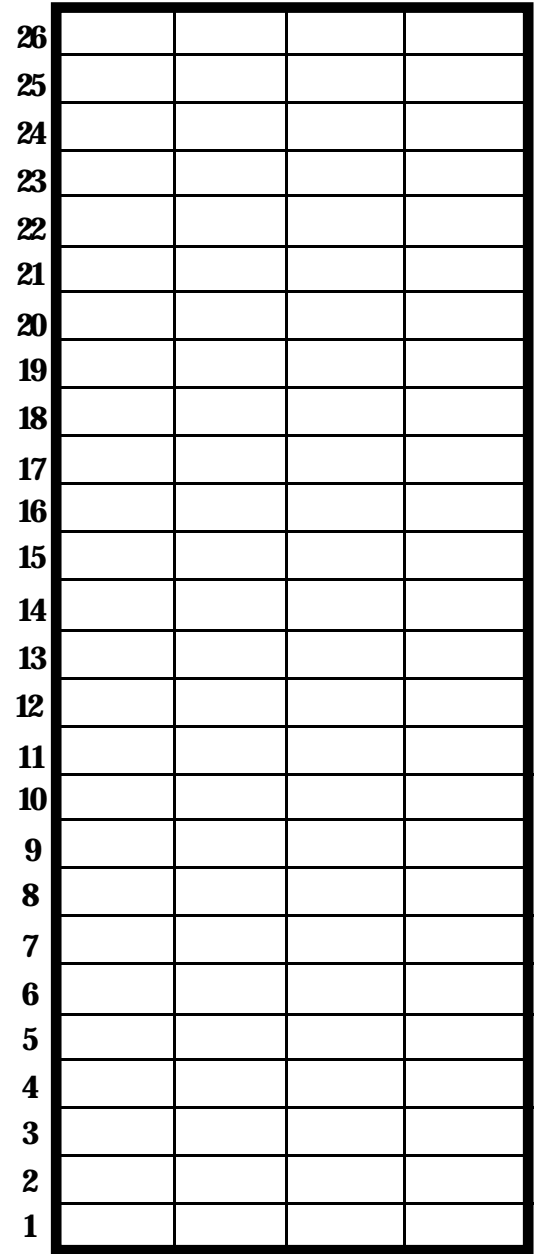
Eye Color



Blue      Green      Brown

Total    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

Hair Color



Yellow    Red    Brown    Black

Total    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

Name: \_\_\_\_\_

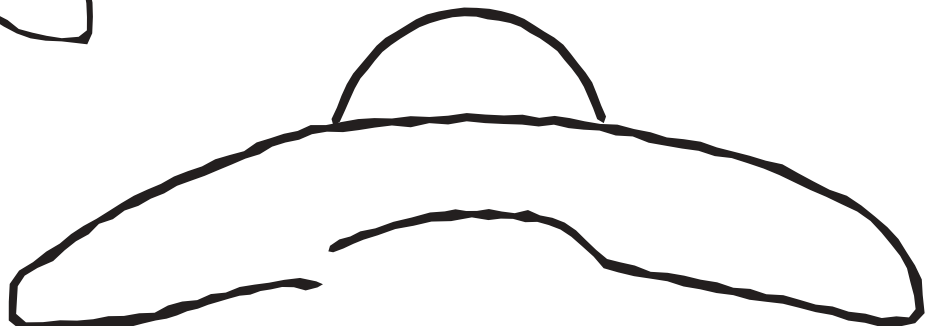
## 1.3 Fading C.J.



Name: \_\_\_\_\_

### 1.3 Fading C.J.

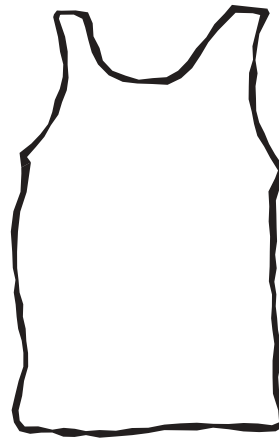
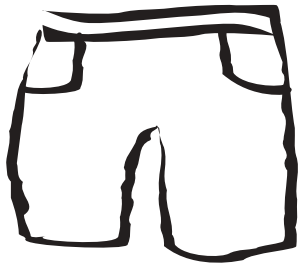
#### Sun-Safe Clothing



Name: \_\_\_\_\_

## 1.3 Fading C.J.

### Not Sun-Safe Clothing



## 1.4 Sun and You



### **Sun, Sun**

Sun, sun here to stay.  
Come to brighten up our day.  
You make warmth and food and light.  
Things about you are so right.

But...

You can fade and make things dry.  
You are the power in the sky.  
You can also burn our skin.  
We'll take care, so we can win!

Finish the poem on the lines below:

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Name: \_\_\_\_\_

## 1.5 Sun and You Secret Decoder

Find the words using the secret decoder!

1. \_\_\_\_\_  
(2, h) (4, g) (7, b) (1, c)

2. \_\_\_\_\_  
(2, h) (7, e) (1, c) (7, h) (7, e) (1, g) (1, c)

3. \_\_\_\_\_  
(2, h) (7, e) (1, c)

4. \_\_\_\_\_  
(4, e) (4, c) (2, f) (6, h)

5. \_\_\_\_\_  
(6, d) (7, b) (5, a) (2, d) (8, d)

6. \_\_\_\_\_  
(4, e) (1, g) (6, h) (5, f) (4, g) (6, d) (6, h) (2, h)

7. \_\_\_\_\_  
(2, h) (7, e) (1, c) (2, h) (4, c) (4, e) (6, h)

8. \_\_\_\_\_  
(2, h) (7, g) (6, f) (8, d) (2, h)

Name: \_\_\_\_\_

## 1.5 Sun and You Secret Decoder

