

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 the atmosphere is thinner.

Your skin is a very complex organ that provides your body with a sensory bridge to the world. The largest organ in the body, 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 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

Unit 1 presents the cause-and-effect relationship between exposure to the sun's ultraviolet (UV) radiation and serious damage to human skin and eyes. Students examine the consequences of too much sun exposure. Through worksheet activities, students investigate some inherited (skin phototype) and environmental (latitude, elevation, weather) factors that affect the amount of sunlight they receive. Students learn that if they reduce the amount of time they spend in the sun unprotected, they can help prevent serious skin and eye damage later in life.

VOCABULARY

Cataract: a clouding of the eye's lens.

Climate: pattern of weather.

Elevation: height above sea level for any point on Earth.

Equator: imaginary circle that divides the Earth in half between the North and South Poles.

Freckles: dark patches of melanin in skin.

Latitude: distance North or South from the equator measured in degrees.

Melanin: brown pigment produced in the lower part of the epidermis layer of skin that gives skin its color.

Photoaging: early aging of skin caused by the sun.

Radiation: energy from the sun.

Risk: possibility or chance of harm.

Risk Factor: anything that increases harm or the chance of harm.

Skin Cancer: abnormal growth of skin cells.

Skin Phototype: classification of skin based on its reaction to the sun.

Sun Exposure: level of ultraviolet radiation received at a particular location.

Suntan: darkening of normal skin color due to exposure to ultraviolet light.

Ultraviolet Light: invisible energy from the sun measuring between 200 and 400 nanometers in wave length.

ACTIVITY SYNOPSIS

Setting The Stage

• 1.1 RAISINS AND GRAPES

This activity sets the stage for the four sun safety units. It compares a raisin and a grape to human skin to illustrate the effect that too much sun exposure can have on unprotected skin.

Learning Activities

• 1.2 WHAT'S MY SKIN PHOTOTYPE?

Students describe how their skin reacts to the sun and identify their skin phototype. They examine how skin phototype can affect sun exposure and skin damage.

• 1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Students investigate ways that the main characteristics of their environment (such as latitude, elevation and weather) can affect the amount of sun exposure they receive compared to people from other regions of the world.

Wrapping It Up

• 1.4 MY PHOTO POEM

In this summary activity, students compose a poem about their skin phototype and risk for sun damage using the Japanese haiku format.

In-Class Assignment

• 1.5 MY OUTDOOR ACTIVITY CHART

In this assignment, students record their outdoor activities and the amount of time they spend outdoors during daylight hours for up to a week.

Assessing Student Learning, Unit 1

• 1.6 MAKE A SUN-SAFE CHOICE

After reading a scenario, students help the characters decide who needs to be the most careful to protect themselves in the sun.

Setting the Stage

1.1 RAISINS AND GRAPES

ACTIVITY SYNOPSIS

This activity sets the stage for the four sun safety units. It compares a raisin and a grape to human skin to illustrate the effect that too much sun exposure can have on unprotected skin.

LEARNING OUTCOMES

After this activity, students will be able to:

- Define sun exposure.
- Describe the sun as both helpful and harmful to life on Earth.
- List at least three ways the sun can harm skin and eyes.
- Explain that skin and eye damage may be prevented by limiting exposure to the sun's rays.

ACTIVITY

Place one raisin and one grape on each student's desk. Ask students to examine them.

Lead a brief discussion about the differences between the raisin and the grape using the following questions:

- How are the raisin and the grape different?
(The grape is plump, fresh, smooth, and moist; the raisin is small, dry and wrinkled.)
- How are the raisin and the grape similar?
(They were both grapes at one time.)
- What would happen if we put the grape out in the hot sun for a while? (It would dry up and turn into a raisin.)
- What causes a grape to turn into a raisin?
(The sun's energy dries things.)
- How are the raisin and the grape like your skin?
(The grape is like healthy, young skin, and the raisin is like skin that has been out in the sun too long.)

Tell the students that the sun provides the energy to sustain life on Earth. Without it you would not have light, heat, weather, plants, or food. Too much sun,

ACTIVITY 1.1

Supplies Provided

- None

Supplies Needed

- Raisins (one per student)
- Grapes (one per student)

Approximate Time

- 10 minutes

Preparation

- Buy raisins and grapes.

however, can cause skin to dry out, lose its elasticity, and wrinkle. This can make someone look older than they really are. The sun also can cause freckles, sunburns, a tan, cataracts in the eyes, pre-cancerous sores, and skin cancer. These are all types of sun damage. The longer skin is exposed (out in the open, unprotected) to the sun, the more damage it receives.

Ask the students if they have ever seen someone with sun-damaged skin. Ask students to think about older people they have seen who have very tanned, rough, wrinkled, weathered skin.

Tell the students that the class is starting a group of lessons called Sunny Days, Healthy Ways. These lessons will help them learn about the sun and ways to protect their skin, eyes and lips from the sun's powerful ultraviolet radiation. This type of protection is called sun safety. It is important to know the amount and strength of the sunlight you are exposed to in your daily life. A small amount of exposure to sunlight can be healthy, but too much sun can be dangerous.

Learning Activities

1.2 WHAT'S MY SKIN PHOTOTYPE?

ACTIVITY SYNOPSIS

Students describe how their skin reacts to the sun and identify their skin phototype. They examine how skin phototype can affect sun exposure and skin damage.

LEARNING OUTCOMES

After this activity, students will be able to:

- Identify their skin phototype.
- Assess their risk for exposure to ultraviolet light and skin damage based on their skin phototype.

ACTIVITY

Tell students that exposure to the sun's ultraviolet radiation can damage skin. Using artificial sources of ultraviolet radiation, such as sunlamps and tanning booths, also can lead to skin damage. The more ultraviolet light you are exposed to over time, or the more bad sunburns you get, the greater your chance of developing skin cancer later in life. But how much ultraviolet radiation do you receive? There are three main factors that affect the level of ultraviolet light you receive and your risk or chance for skin cancer:

- Your skin phototype — how your skin reacts to the sun.
- Your environment — where you live (your climate, latitude, elevation).
- Your behavior — if you protect yourself or not.

Tell students that skin phototype is determined largely by the way your skin responds to the sun. Skin, hair and eye color are related to skin phototype, too.

Tell students that you have no control over your skin phototype or your environment (e.g., how many sunny days there are). But it is important to understand these two things in order to know how to protect yourself in the sun. Unit 1 will address these things that are not in our control.

ACTIVITY 1.2

Supplies Provided

- Activity Sheet: 1.2: What's My Skin Phototype? (page 1.2.1)

Supplies Needed

- Magazine pictures or photographs to illustrate skin types.
- Pencils

Approximate Time

- 30 minutes

Preparation

- Cut photographs out of magazines to represent people of each skin phototype.
- Make one copy of the activity sheet for each student.

Tell students that you do, however, have control over your own behavior. Units 2, 3, and 4 will address the three ways you can change your behavior to be sun safe: (1) limiting time in the sun, (2) wearing cover-up clothes, and (3) using sunscreen with an SPF 15 or more.

Introduce this observation and classification activity to the students. Tell students that the activity will help them identify their own skin phototype and sensitivity to the sun.

Ask students to name other words that begin with the “photo” prefix. Examples include photoaging, photograph, photosynthesis, and photogenic. Ask students what these words have in common. Light! “Photo” means light or energy from the sun. “Type” is a grouping. There are four skin phototypes (groupings of skin lightness or darkness).

Tell students that skin color is determined by how much melanin you have in your skin. Melanin is a brown pigment produced in one of the layers of the skin that gives skin its color. Use magazine photographs to illustrate the different skin types: fair with or without freckles, light brown, brown, and black (see activity sheet 1.2.1)

Have students determine their own skin phototype. Distribute a copy of Activity Sheet 1.2: What’s My Skin Phototype? to each student. Review the instructions on the worksheet with the class and have them answer the questions about themselves.

A person’s skin phototype—its lightness or darkness—should match one of the four groups more closely than the others. As a visual aid, display photographs of people from magazines to represent each of the skin phototypes.

After several minutes, have students cluster into four separate areas of the classroom designated as “Type 1,” “Type 2,” and so on, based on what skin type they have recorded on their worksheet. If a student’s hair, eye and skin color don’t exactly match one of the four types, tell them that skin color supercedes hair and eye color for classification purposes.

Discuss students’ activity sheet answers and the class clusters using the following questions:

- Look at the different groups. Is everyone in the most appropriate group for his or her skin type? (Students can move to another group if necessary).
- Are all four skin types represented in the class? If not, which ones are not represented? What is the most common skin type or types in the class?

- What do the people in each of the groups have in common in terms of hair color, eye color and skin tone? What patterns can we see? (People with blond hair usually have blue eyes and light skin; people with dark skin usually do not have freckles, etc.)
- Are hair and eye color by themselves a good way to tell what skin type a person is? (Not always.) What else do you need to know? (You need to know skin tone and how the skin reacts to sunlight.)
- Can people with the same eye and hair color have different skin phototypes? (Yes.)
- Why is it important to know your skin phototype? (If you know how your skin reacts to sunlight, you can take special care to protect it.)
- Which groups need to be most careful to protect themselves in the sun? (Everyone needs to protect their skin from the sun, but people with Type 1 or Type 2 skin must take extra care to protect their fair skin.)
- Why do people with light skin phototypes need to be the most careful? (Since their light skin has little melanin to protect it, they have an increased risk for sun damage because they sunburn more easily. Increased risk means having a greater chance or possibility of something harmful happening, such as skin cancer, later in life.)

BRIGHT SPOT

Everyone's heritage is special. Plan a family tree activity in connection with this lesson. Have students use photographs to show the skin phototypes in their families. Display the family trees in the classroom.

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

ACTIVITY SYNOPSIS

Students investigate ways that the main characteristics of their environment (such as latitude, elevation and weather) can affect the amount of sun exposure they receive compared to people from other regions of the world.

LEARNING OUTCOMES

After this activity, students will be able to:

- List factors that affect the amount of ultraviolet light they receive.
- Describe how the factors affect the amount of ultraviolet light they receive.
- Assess level of ultraviolet light they are exposed to and their risk for skin damage.

ACTIVITY

Remind students that skin phototype is not the only thing that can increase your chances for skin damage. Many characteristics of your environment (where you live) also can affect how much ultraviolet light you receive and your risk for skin damage.

Ask students to name things about where someone lives that may affect how much sunlight they receive? (Answers could include distance from the equator, number of sunny days, weather, pollution, elevation, thinning of the ozone layer.)

Using the transparencies, describe the following things about the environment that can affect the level of ultraviolet light of a particular location.

Season

Display Transparency 1.3: Where in the World is UV Light the Strongest? (page 1.3.1). As the Earth slowly circles around the sun each year, different parts of the Earth face the sun. This rotation, along with the tilt (23.5 degrees) of the Earth on its axis, affects the amount of visible light, heat, and invisible light (ultraviolet radiation) that is received at a certain location. These changes in sun intensity make the

ACTIVITY 1.3

Supplies Provided

- Transparency 1.3: Where in the World is UV Light the Strongest? (pages 1.3.1–1.3.3)
- Activity Sheet 1.3: Where in the World is UV Light the Strongest? (pages 1.3.4–1.3.9)

Supplies Needed

- Overhead projector
- Transparency film
- Pencils

Approximate Time

- 50 minutes

Preparation

- Obtain local geography and climate data listed on page 1.3.3 of the transparency set and put the answers on the transparency for use in class.
- Make one copy of each page of the transparency on transparency film.
- Make one copy of each page of the activity sheet for each student.

seasons of the year. When the North Pole tilts toward the Sun, the upper half of the Earth (Northern Hemisphere) has summer and the lower half of the Earth (Southern Hemisphere) has winter. Six months later, the North Pole tilts away from the Sun. When this happens, the Northern Hemisphere has winter and the Southern Hemisphere has summer. Areas at or near the equator are not affected by the tilt like the Poles and, therefore, have no real change in season. Exposure to ultraviolet light is greatest (1) at or near the equator where it is summer all year round, and (2) in summer months in other parts of the world because that is when they have more hours of sunlight, stronger ultraviolet radiation, and hotter temperatures.

Time of Day

Clearly, the sun's rays are stronger and more intense when directly overhead at midday. The concept of ultraviolet radiation varying in intensity depending on time of day is addressed in detail in Unit 2.

Weather and Climate

Ask students what makes weather. The sun heats the Earth and the air. When the sun heats up some parts of the Earth more than other parts, the difference in heat makes air move and rise and become wind. The heat and wind generated by the sun make changes in weather all over the world. Some places in the world are cloudy and rainy much of the time (Seattle, Washington or the highlands of Scotland). Ultraviolet light can pass through clouds. Even on rainy or overcast days, more than 50 percent of the ultraviolet rays can get through the cloud cover. Other parts of the world are sunny and dry much of the time (Phoenix, Arizona or the outback of Australia). People who live in locations with hotter temperatures and more sunny days have more opportunities to be exposed to more ultraviolet light. A location's climate, or weather pattern, also is related to its elevation and latitude. Pollution and the thinning of the ozone layer also affect levels of ultraviolet radiation, but they are not addressed here in detail.

Elevation

Elevation is the height of a location above sea level. Sea level is a constant—it is the same all over the world. Elevation is measured in feet above sea level. A city located next to the ocean would have a low elevation. For example, New Orleans, Louisiana is 4 feet above sea level. A city in the mountains would have a higher elevation. Denver, Colorado is 5,286 feet above sea level—almost exactly a mile! Elevation affects how much ultraviolet light you receive. As you go up in elevation, ultraviolet rays are stronger, and there is less atmosphere to absorb them. For every 1,000 feet above sea level, the sun's intensity increases by about 4 percent. Ultraviolet light is about 20 percent stronger in Denver than in New Orleans due to the elevation. People who live at higher elevations such as in the mountains are likely to receive more sun exposure.

Latitude

Display Transparency 1.3: *Where in the World is UV Light the Strongest?* (page 1.3.2). Because the Earth's surface is curved, some locations receive more direct sunlight (ultraviolet radiation) and heat (infrared radiation). The North and South Poles receive rays that are more spread out with less heating power. Thus, the rays are less intense, and the temperature is cooler. Locations at or near the equator (0 degrees latitude) receive more direct, stronger ultraviolet rays and have hotter temperatures. The latitude of other locations is measured in degrees from the equator. The North Pole, for example, is located at 90 degrees north latitude. In the U.S., there are many more people with skin cancer in southern states closer to the equator than in northern states. People who live at lower latitudes (closer to the equator) are likely to receive more sun exposure.

Describe the graphing activity. Students identify the factors that affect sunlight levels for several locations around the world. Students also identify characteristics of their local environment and compare them to those of the other locations.

Distribute a copy of Activity Sheet 1.3: *Where in the World is UV Light the Strongest?* (pages 1.3.4 to 1.3.9) to each student. Review the instructions with the class.

Display Transparency 1.3: *Where in the World is UV Light the Strongest?* (page 1.3.3). It should include the information needed to compare the local environment to the other graphed data from around the world.

Have students work individually or in pairs to construct the five graphs. Ask students to complete the questions using the graphed data, the transparencies, and the material covered in class about how geography, weather, and skin phototype affect ultraviolet light exposure. Discuss responses and review concepts as a class.

Wrapping It Up

1.4 My PHOTO POEM

ACTIVITY SYNOPSIS

In this summary activity, students compose a poem about their own skin phototype and risk for sun damage using the Japanese haiku format.

ACTIVITY

Have students review the information they discovered about skin phototype and environment. Ask students what they learned about the sun, their skin, and their risk for skin damage.

Distribute a copy of Activity Sheet 1.4: My Photo Poem to each student. Review the instructions and have students work independently to compose a haiku. To personalize this activity, have students glue or tape their photos to their poems. The poems can be shared as a class and displayed around the classroom.

Tell students that they cannot control their skin phototype or environment, but they can control their own behavior. In fact, there are many things they can do to reduce the amount of time they spend in the sun and their risk for skin damage. The students will learn about things they can do to be sun safe in the next three units.

ACTIVITY 1.4

Supplies Provided

- Activity Sheet 1.4: My Photo Poem (page 1.4.1)

Supplies Needed

- A photograph of each student
- Glue or tape
- Pencils

Approximate Time

- 20 minutes

Preparation

- Write a sample haiku (optional).
- Several days in advance, ask students to bring in a photograph of themselves.
- Make one copy of the activity sheet for each student.

In-class Assignment

1.5 MY OUTDOOR ACTIVITY CHART

(This information is needed to complete Activities 2.1, 3.1, and 4.1).

ACTIVITY SYNOPSIS

In this assignment, students record their outdoor activities and the amount of time they spend outdoors during daylight hours for up to a week.

ACTIVITY

Distribute an eight-page set of activity sheets to each student. It must be completed before starting Unit 2.

Review the instructions on the activity sheet with the students. They will be recording information about their outdoor activities for up to a week.

Allow students five minutes each morning to fill out the activity chart for the previous day. During the school week, at least some of the outdoor activities will be the same for the entire class. Have students keep the charts at school to help prevent loss.

ACTIVITY 1.5

Supplies Provided

- Activity Sheet 1.5: My Outdoor Activity Chart (pages 1.5.1–1.5.2)

Supplies Needed

- Pencils

Approximate Time

- 5 minutes each morning for 1 week

Preparation

- Make one copy of page 1.5.1 and seven copies of page 1.5.2 for each student.

Assessing Student Learning, Unit 1

1.6 MAKE A SUN-SAFE CHOICE

ACTIVITY SYNOPSIS

After reading a scenario, students help the characters decide who needs to be the most careful to protect themselves in the sun.

ACTIVITY

Distribute a copy of Assessment 1.6: Make a Sun-Safe Choice to each student. Review the instructions with the class. The assessment can be used as a graded test to document progress or as a review worksheet to reinforce Unit 1 content.

ACTIVITY 1.6

Supplies Provided

- Assessment 1.6:
Make a Sun-Safe Choice
(page 1.6.1)

Supplies Needed

- Pencils

Approximate Time

- 20 minutes

Preparation

- Make one copy of the assessment for each student.

UNIT 1 ANSWERS

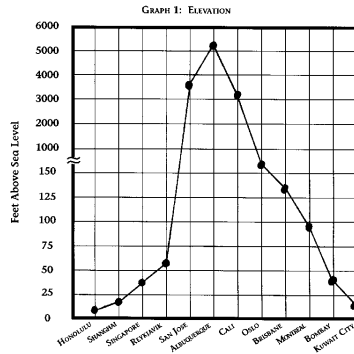


1.2 WHAT'S MY SKIN PHOTOTYPE?

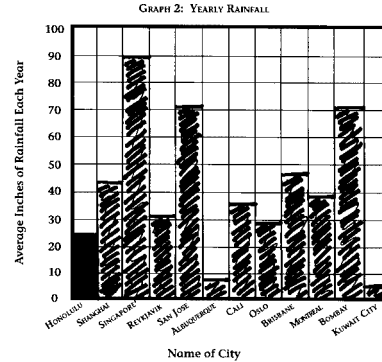
1. - 5. Answers will vary.

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

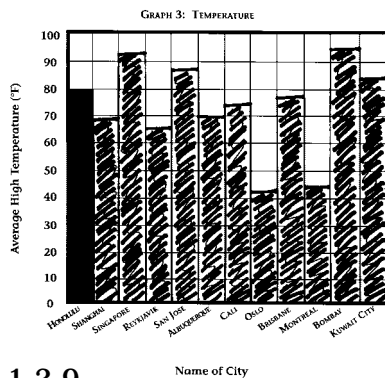
1.3.5



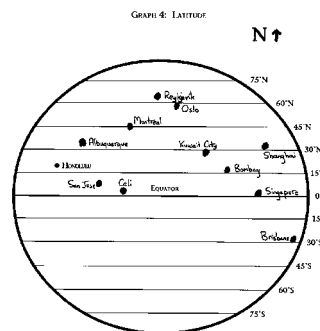
1.3.6



1.3.7



1.3.8



1.3.9

Name of City

- Answers will vary, but should list cities with low latitude, high elevation, and hotter, drier weather. Examples: San Jose, Cali, Honolulu, Bombay, Singapore, Albuquerque.
- Answers will vary, but should list cities with lower elevation, cooler weather, and a latitude farther away from the equator. Examples: Reykjavik, Oslo, Montreal.
- Answers will vary.

1.5 MY OUTDOOR ACTIVITY CHART

Answers will vary.

1.6 MAKE A SUN-SAFE CHOICE

- C.J. needs to be most careful. C.J has a Skin Type I, and, therefore, is most likely to get a sunburn if the friends spend the day outdoors.
- To be most sun safe, the friends should go to the indoor skating party during the day. The summer season combined with Albuquerque's low latitude, high elevation, and sunny climate mean that the sun will be very intense outdoors on July 4th.

Name: _____

1.2 WHAT'S MY SKIN PHOTOTYPE?

Everyone is unique on the inside and the outside. Our eyes, hair and skin come in many different colors and combinations to make us special. What's your combination? Does it make you more sensitive to the sun? Check the box that best describes you for each question. Then circle the skin phototype that most closely matches you.

1. The color of my eyes:

- Blue
- Green
- Hazel
- Brown

2. The color of my hair:

- Blonde Black
- Red
- Light brown
- Dark brown

3. The color of my untanned skin:

- Pale or milky white
- Very light brown
- Tan, brown, or olive
- Brown, dark brown, or black

4. When exposed to the summer sun at midday for 15 minutes, my skin:

- Never tans, always burns
- Sometimes tans, usually burns
- Usually tans, sometimes burns
- Always tans, rarely burns

5.

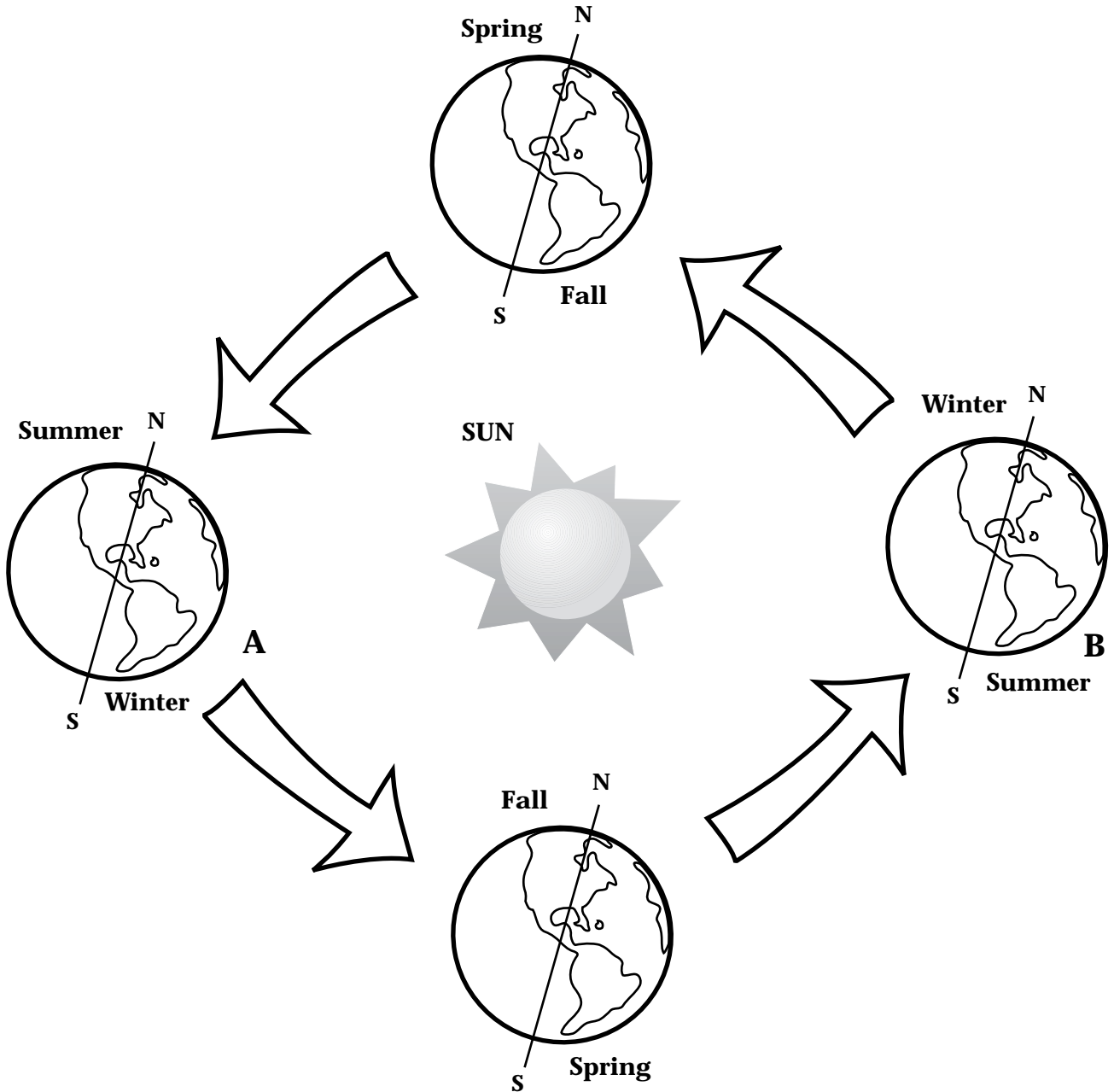
Skin Type (circle one)	Skin Color in Unexposed Area	Tanning History	Hair Color	Eye Color
Type 1: Never Tans/ Always Burns	Pale or milky white, alabaster, freckles	Develops red sunburn; painful swelling; skin peels	Red or blonde	Blue, green, or hazel
Type 2: Sometimes Tans/ Usually Burns	Very light brown, sometimes freckles	Usually burns; pinkish or red coloring appears; can gradually develop light brown tan	Blonde or light brown	Blue, green, or hazel
Type 3: Usually Tans/ Sometimes Burns	Light tan, brown, or olive; distinctly pigmented	Rarely burns; shows moderately rapid tanning response	Light or dark brown	Hazel or brown
Type 4: Always Tans/ Rarely Burns	Brown, dark brown, or black	Rarely burns; shows very rapid tanning response	Dark brown or black	Brown

Source: U.S. Environmental Protection Agency, 1997

Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

HOW SEASONS WORK

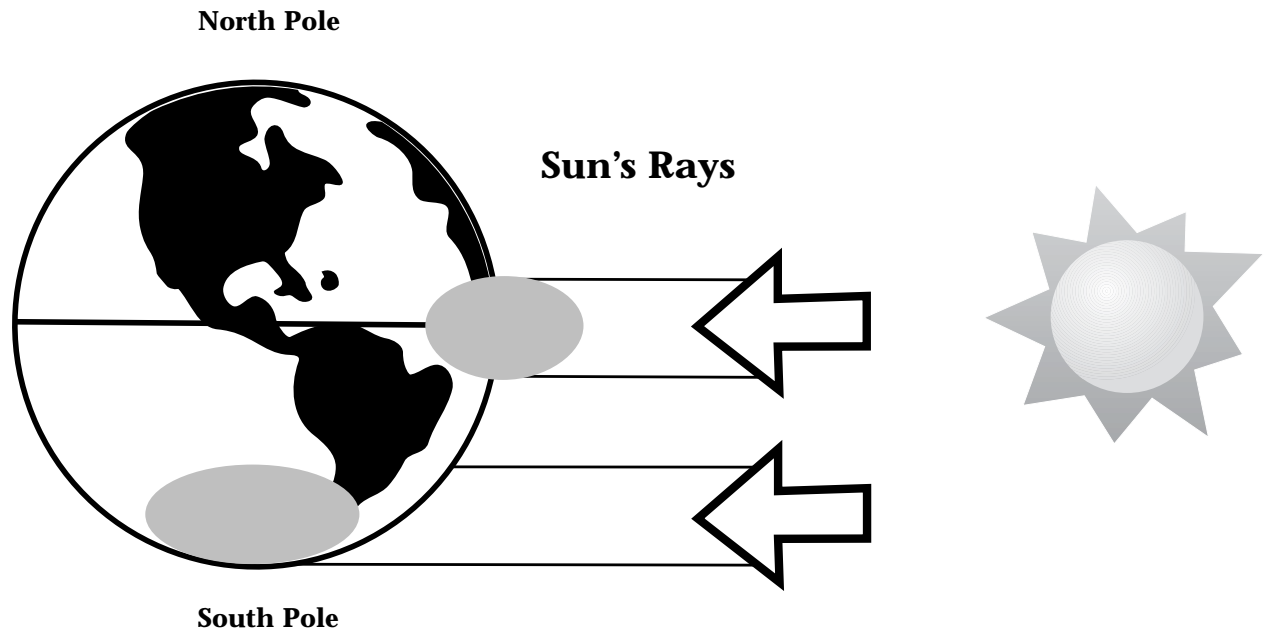


When the tilt is closest to the sun (A) the top half of the earth (Northern Hemisphere) has summer. When the tilt faces away from the sun (B), the Northern Hemisphere has winter.

Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Latitude and Sun Intensity



1. At the North and South Poles the sun's rays are more spread out because of the curve of the earth. Because they heat a bigger area, the rays have less heating power. So, climates are colder. Ultraviolet light also is less direct and weaker.
2. At the equator, the sun's rays are more direct. Because they heat a smaller area, the rays have more heating power. So, climates near the equator are hotter. Ultraviolet light also is more direct and stronger.

Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Using sources from your school, the internet, or local public library, record the data asked for below for the city where your school is located. If data is not available for your town, use the largest city closest to your town.

Our Local Geography and Weather Data

City:

State:

Country:

Continent:



Latitude:

N or S of equator

Elevation:

feet above sea level

Average Annual Rainfall:

inches per year

Average High Temperature:

degrees Fahrenheit

My sources were:

Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Use the information in the Geography and Weather Data Table below to make graphs 1 through 4 on the following activity sheets. Then answer the questions on the last activity sheet.

Geography and Weather Data for 12 Cities Around the World

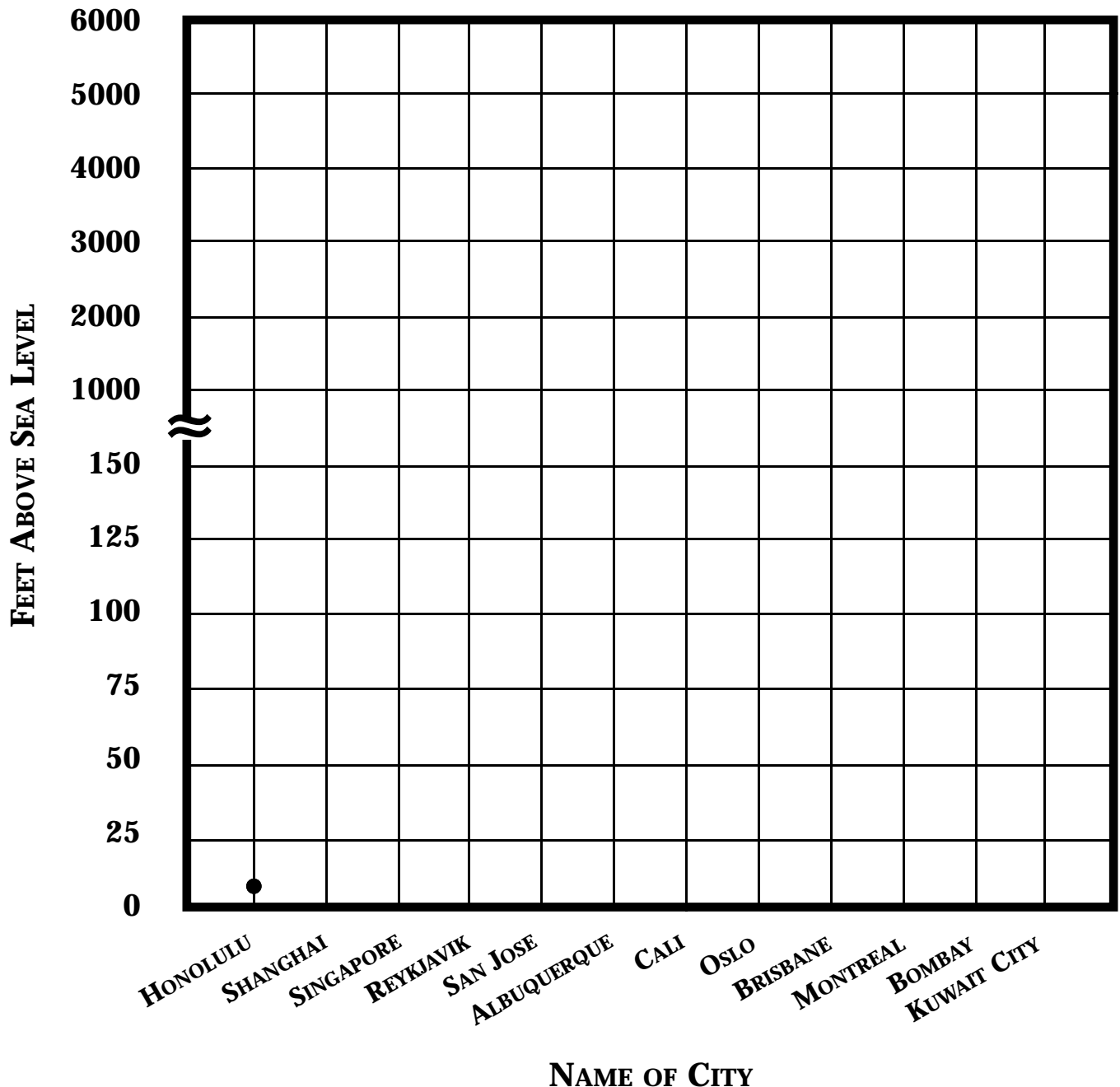
Name of City	Elevation	Average Annual Rainfall	Average High Temperature	Latitude
Honolulu, Hawaii	7 feet	25 inches	80°F	21°N
Shanghai, China	22 feet	44 inches	69°F	31°N
Singapore, Singapore	33 feet	90 inches	93°F	1°N
Reykjavik, Iceland	59 feet	31 inches	66°F	64°N
San Jose, Costa Rica	3760 feet	71 inches	88°F	9°N
Albuquerque, New Mexico	5311 feet	8 inches	70°F	35°N
Cali, Colombia	3162 feet	37 inches	74°F	3°N
Oslo, Norway	308 feet	29 inches	42°F	59°N
Brisbane, Australia	137 feet	47 inches	78°F	27°S
Montreal, Canada	98 feet	39 inches	45°F	45°N
Bombay, India	37 feet	71 inches	95°F	18°N
Kuwait City, Kuwait	16 feet	5 inches	84°F	29°N

Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Using the data in the Geography and Weather Data Table, graph the **elevation** of each city on Graph 1. To make a line graph, put a dot on the line for each city level with the number of feet it is located above sea level. Honolulu has been done as an example. Then draw a line to connect the dots. Look at what the line graph is showing you.

GRAPH 1: ELEVATION

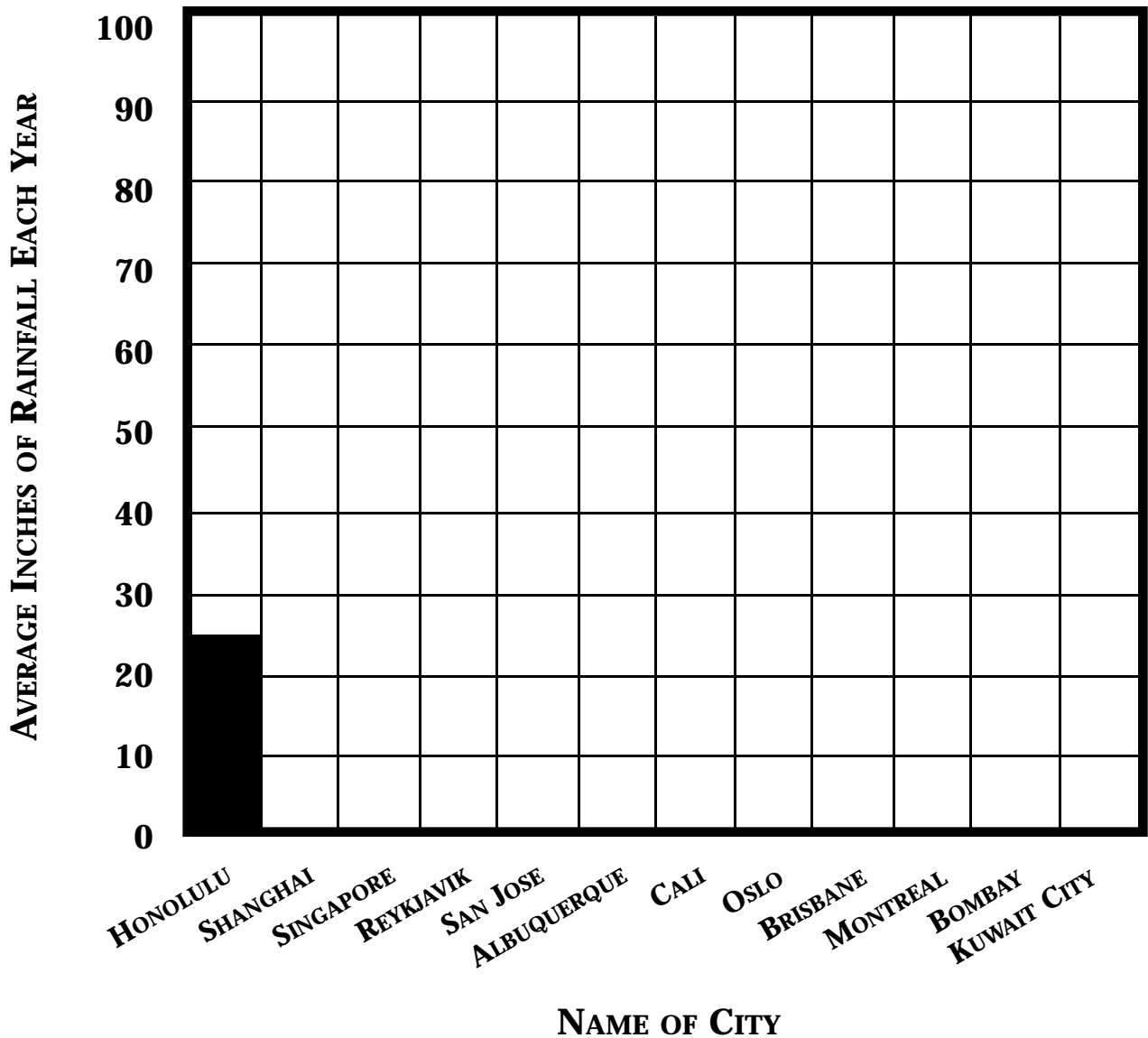


Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Using the data in the Geography and Weather Data Table, graph the **average annual rainfall** (in inches) of each city on Graph 2. To make a bar graph, color in the squares for each city up to the number that shows how many inches of rainfall it has each year. Use a different color for each city. Honolulu has been done as an example. When all the bars are filled in, look at what the bar graph is showing you.

GRAPH 2: YEARLY RAINFALL

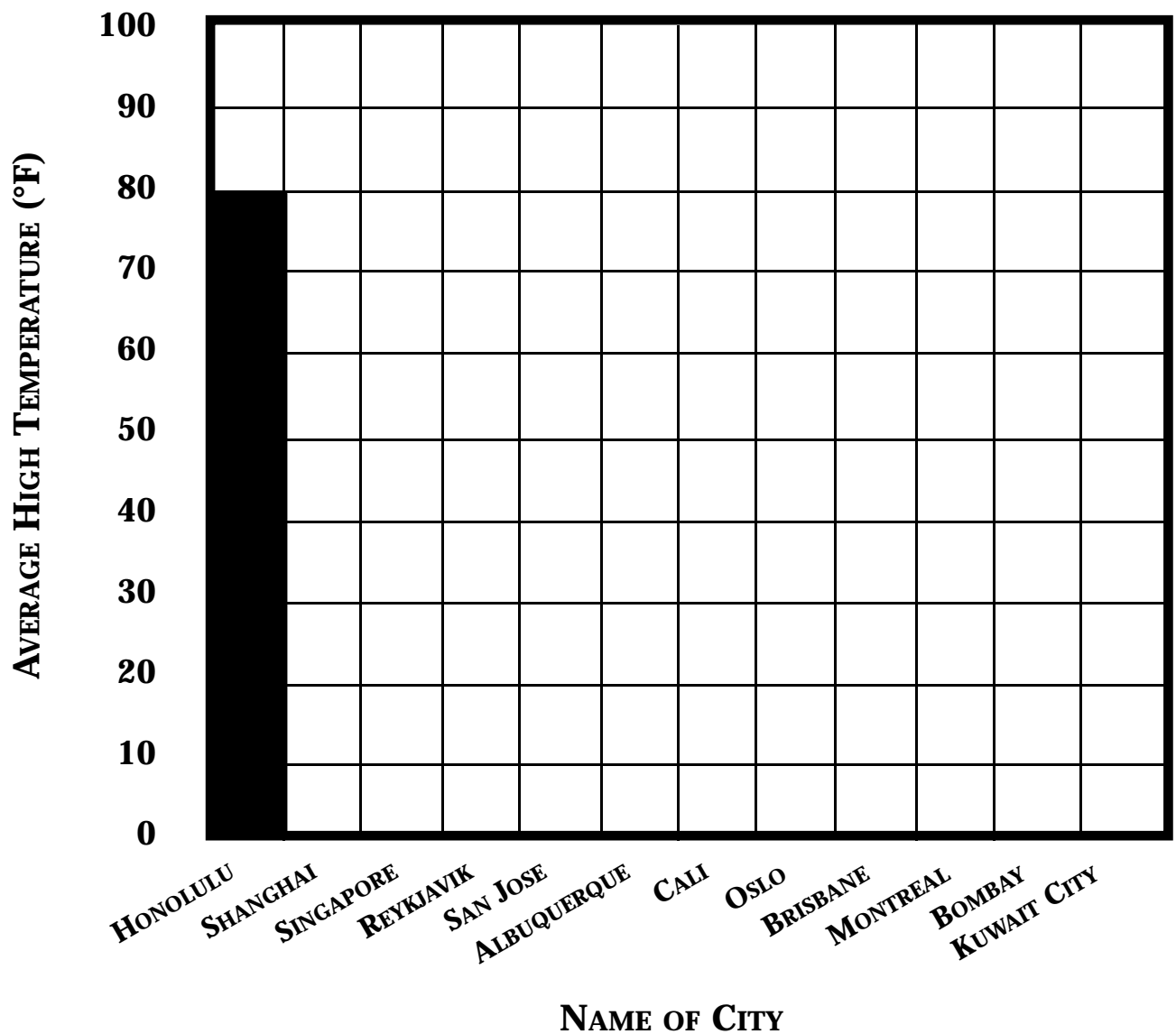


Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Using the data in the Geography and Weather Data Table, graph the average annual high **temperature** (in degrees Fahrenheit) of each city on Graph 3. To make a bar graph, color in the squares for each city up to the number that shows the average high temperature it has each year. Use a different color for each city. Honolulu has been done as an example. When all the bars are filled in, look at what the bar graph is showing you.

GRAPH 3: TEMPERATURE

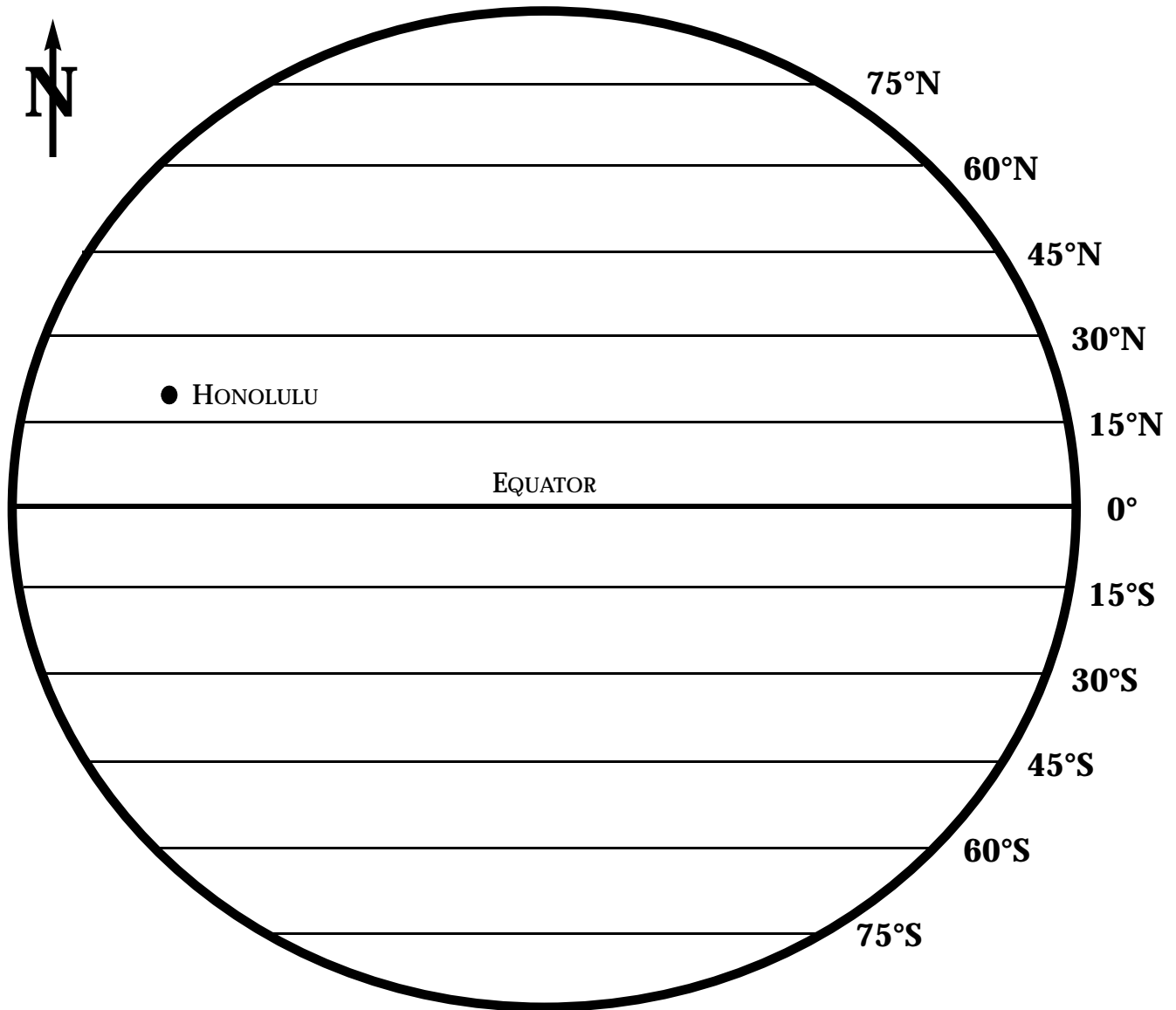


Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Using the data in the Geography and Weather Data Table, graph the latitude of each city on Graph 4. To complete this point graph, place a dot in the circle level with the degrees latitude (North or South) that the city is located. Honolulu has been done as an example. Label each point with the name of the city it represents. Then look at what the graph is showing you.

GRAPH 4: LATITUDE



Name: _____

1.3 WHERE IN THE WORLD IS UV LIGHT THE STRONGEST?

Based on the elevation, latitude, and weather graphs that you made, answer the following questions:

1. Which city do you think receives the most ultraviolet light? Why?

2. Which city do you think receives the least ultraviolet light? Why?

3. Look at your local geography and weather data and think about your skin phototype. How careful do you think you should be to protect yourself from the sun? Why should you be this careful?

Name: _____

1.4 MY PHOTO POEM

Compose a haiku about your skin phototype and sensitivity to the sun. How careful do you need to be in the sun? Follow the number of syllables needed for each line of the poem.



(TITLE)

(5 syllables)

(7 syllables)

(5 syllables)

Name: _____

1.5 MY OUTDOOR ACTIVITY CHART

Keep a record of each activity that you do outside during daylight hours every day for a week. Mark the answers to the following questions for each activity each day (see boxes.) If you have more than three outdoor activities in one day, write on the back of the activity sheet or use another sheet of paper.

Questions to answer for each activity:

1. What activity were you doing?
2. What time were you outside?
3. What was the weather like?
4. What clothing were you wearing? (Don't forget to describe hats and shoes.)
5. Were you in the shade? If so, for how long and what was the source of the shade?
6. Were you wearing sunscreen?

Example:

Date: January 28, 2000

Day of the week (circle one): M T W TH **F** SAT SUN

Season of the Year (circle one): **Winter** Spring Summer Fall

My Location (city, state): Denver, Colorado

Activity 1: <u>I took my dog, Rio, for a walk in the park.</u>
Out from: <u>9:15</u> a.m. /p.m. to <u>10:00</u> a.m. /p.m.
Weather: <u>Sunny but cool.</u>
My clothing: <u>I was wearing a jacket, long-sleeved shirt, jeans,</u> <u>and tennis shoes.</u>
In shade: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Sunscreen: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Name: _____

1.5 MY OUTDOOR ACTIVITY CHART

Date: _____

Day of the week (circle one): M T W TH F SAT SUN

Season of the Year (circle one): Winter Spring Summer Fall

My Location (city, state): _____

Activity 1: _____ _____
Out from: _____ a.m./p.m. to _____ a.m./p.m.
Weather: _____
My clothing: _____ _____
In shade: <input type="checkbox"/> Yes <input type="checkbox"/> No Sunscreen: <input type="checkbox"/> Yes <input type="checkbox"/> No

Activity 2: _____ _____
Out from: _____ a.m./p.m. to _____ a.m./p.m.
Weather: _____
My clothing: _____ _____
In shade: <input type="checkbox"/> Yes <input type="checkbox"/> No Sunscreen: <input type="checkbox"/> Yes <input type="checkbox"/> No

Activity 3: _____ _____
Out from: _____ a.m./p.m. to _____ a.m./p.m.
Weather: _____
My clothing: _____ _____
In shade: <input type="checkbox"/> Yes <input type="checkbox"/> No Sunscreen: <input type="checkbox"/> Yes <input type="checkbox"/> No

Name: _____

1.6 MAKE A SUN-SAFE CHOICE

Natalie, Raymond, and CJ are best friends. They live in the same neighborhood in Albuquerque, New Mexico. Saturday is the 4th of July and they plan to have fun! But they have to pick between two great choices. They can either go to an outdoor barbeque party at Sundance Park or they can go to a 4th of July skating party at Skateworld. After dark, they are going to watch the fireworks with their families.

The friends learned about sun safety in school. They know that exposure to ultraviolet light can hurt their skin and eyes. They want to protect themselves from the sun. CJ has blonde hair, blue eyes, and fair skin. Natalie has brown hair, brown eyes, and light brown skin. Raymond has black hair, brown eyes, and black skin. Albuquerque has an average high temperature of 70 degrees Fahrenheit. The elevation is 5,311 feet and the latitude is 35 degrees north.

Answer the following questions:

1. All of the friends should be careful to protect their skin from the sun. Who should be the most careful? Discuss skin phototype to explain why you choose that friend.

2. Which activity do you think Natalie, Raymond, and CJ should choose to be the most sun safe? Discuss season, latitude, climate and elevation to explain why you chose that activity.
