



Seasons Come and Seasons Go

Grade: 6

GPS: S6E2. Students will understand the effects of the relative positions of the earth, moon and sun.

- Relate the tilt of the earth to the distribution of sunlight throughout the year and its effect on climate.

Essential Question: How does the tilt of the earth affect sunlight?

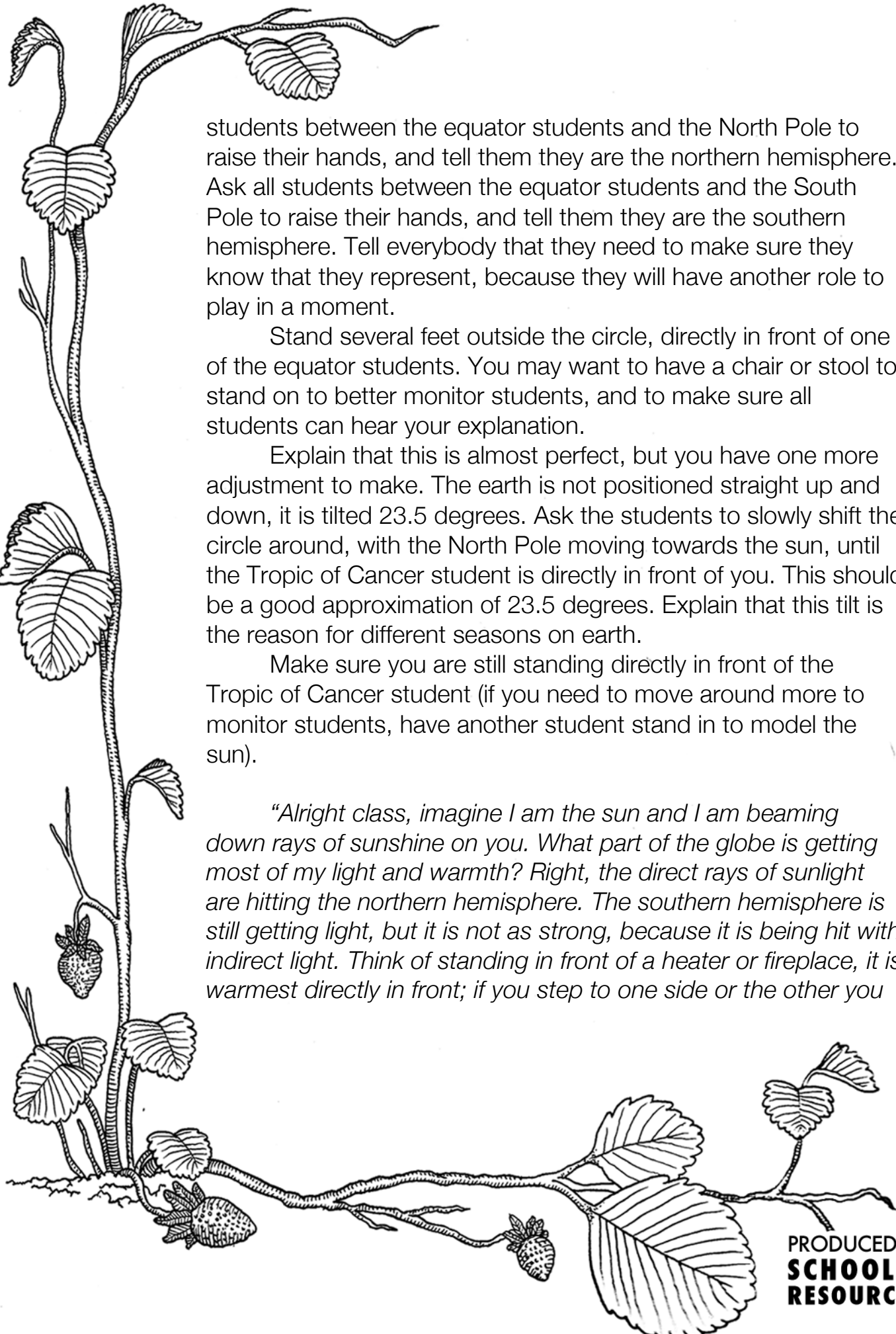
Teacher Note: This lesson uses modeling in an outdoor area to teach how tilt of Earth affects climate. It also uses the seasons to teach about seasonal eating.

Interest Approach

As students come into the classroom, have them write a short paragraph on their favorite season and why it is their favorite. Ask students to share, then ask if any of them wrote about food in their paragraphs. Ask if any of them have certain foods that they only have during their favorite season. Explain that today they are going to learn why there are seasons, and why they are important, including how seasons affect our eating habits and traditions.

Lesson

Go outside to an open area and instruct students to stand in a circle. Tell students that right now they are modeling the Earth. Pass out the included print-out signs to students. North Pole, South Pole, Equator (2), Tropic of Cancer (2), Tropic of Capricorn (2), and make sure they are appropriately positioned. Ask all



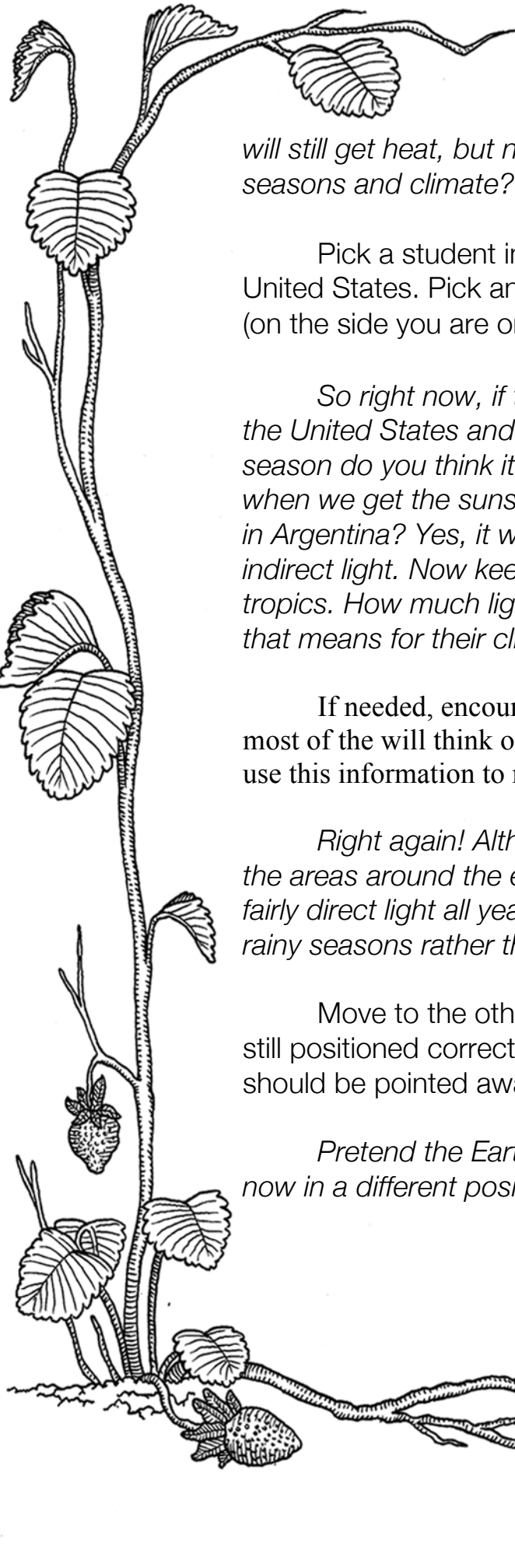
students between the equator students and the North Pole to raise their hands, and tell them they are the northern hemisphere. Ask all students between the equator students and the South Pole to raise their hands, and tell them they are the southern hemisphere. Tell everybody that they need to make sure they know that they represent, because they will have another role to play in a moment.

Stand several feet outside the circle, directly in front of one of the equator students. You may want to have a chair or stool to stand on to better monitor students, and to make sure all students can hear your explanation.

Explain that this is almost perfect, but you have one more adjustment to make. The earth is not positioned straight up and down, it is tilted 23.5 degrees. Ask the students to slowly shift the circle around, with the North Pole moving towards the sun, until the Tropic of Cancer student is directly in front of you. This should be a good approximation of 23.5 degrees. Explain that this tilt is the reason for different seasons on earth.

Make sure you are still standing directly in front of the Tropic of Cancer student (if you need to move around more to monitor students, have another student stand in to model the sun).

“Alright class, imagine I am the sun and I am beaming down rays of sunshine on you. What part of the globe is getting most of my light and warmth? Right, the direct rays of sunlight are hitting the northern hemisphere. The southern hemisphere is still getting light, but it is not as strong, because it is being hit with indirect light. Think of standing in front of a heater or fireplace, it is warmest directly in front; if you step to one side or the other you



will still get heat, but not as much. So how does this affect seasons and climate?"

Pick a student in the northern hemisphere to represent the United States. Pick another student in the southern hemisphere (on the side you are on) to represent Argentina.

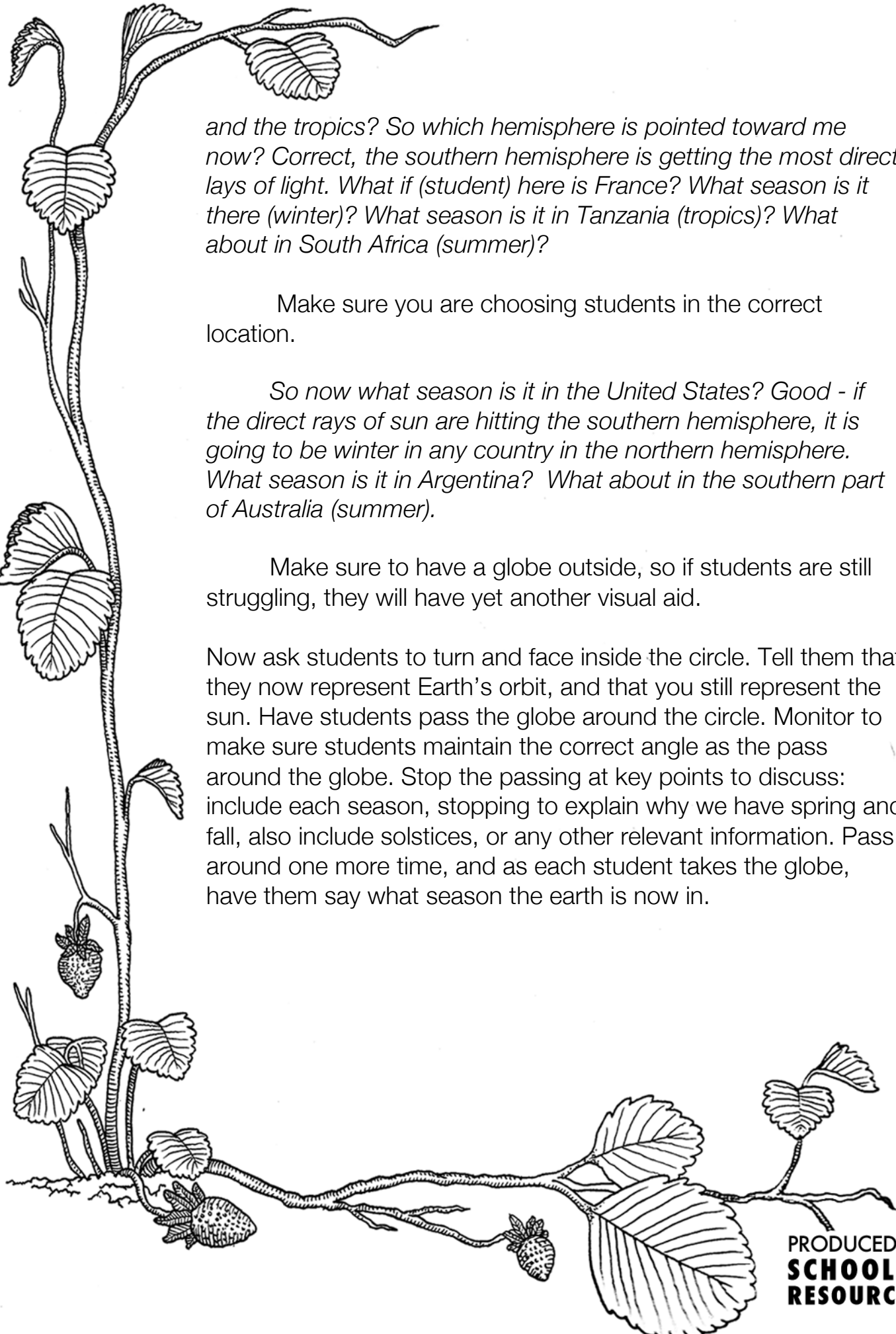
So right now, if the sun is sending the most direct rays to the United States and the rest of the Northern Hemisphere, what season do you think it is? Right, our warmest season is summer, when we get the sun's direct rays. What season do you think it is in Argentina? Yes, it will be winter, because Argentina has only indirect light. Now keep an eye on the equator and between the tropics. How much light are they getting? Now what do you think that means for their climate?

If needed, encourage students to think about tropical locales - most of them will think of warm sunny islands, beaches, etc. Help them use this information to make inferences about the climate there.

Right again! Although there are fluctuations in temperature, the areas around the equator, and between the tropics, receive fairly direct light all year. Areas in the tropics tend to have dry or rainy seasons rather than spring, summer, winter, and fall.

Move to the other side of the circle, and make sure you are still positioned correctly (from this angle, the northern hemisphere should be pointed away from you).

Pretend the Earth has continued orbiting the sun, and is now in a different position. How are things going for the equator



and the tropics? So which hemisphere is pointed toward me now? Correct, the southern hemisphere is getting the most direct rays of light. What if (student) here is France? What season is it there (winter)? What season is it in Tanzania (tropics)? What about in South Africa (summer)?

Make sure you are choosing students in the correct location.

So now what season is it in the United States? Good - if the direct rays of sun are hitting the southern hemisphere, it is going to be winter in any country in the northern hemisphere. What season is it in Argentina? What about in the southern part of Australia (summer).

Make sure to have a globe outside, so if students are still struggling, they will have yet another visual aid.

Now ask students to turn and face inside the circle. Tell them that they now represent Earth's orbit, and that you still represent the sun. Have students pass the globe around the circle. Monitor to make sure students maintain the correct angle as they pass around the globe. Stop the passing at key points to discuss: include each season, stopping to explain why we have spring and fall, also include solstices, or any other relevant information. Pass around one more time, and as each student takes the globe, have them say what season the earth is now in.



Learning Activity

The tilt of the earth gives us seasons, but seasons are more important than just to give us a separate time of year to play football or go swimming. Without the perfect tilt, earth may not be able to sustain life! One important part of the seasons are different growing seasons. Different crops grow in spring, summer, fall and winter in the Northern and Southern hemispheres, and tropical areas around the equator have alternating rainy and dry seasons that dictate growing seasons. Look around the garden...what fruits and vegetables do you see growing?

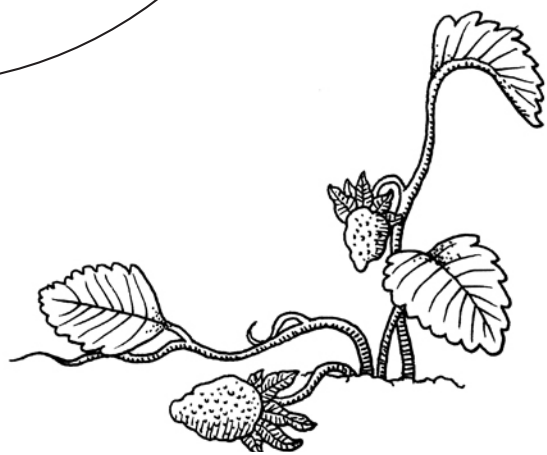
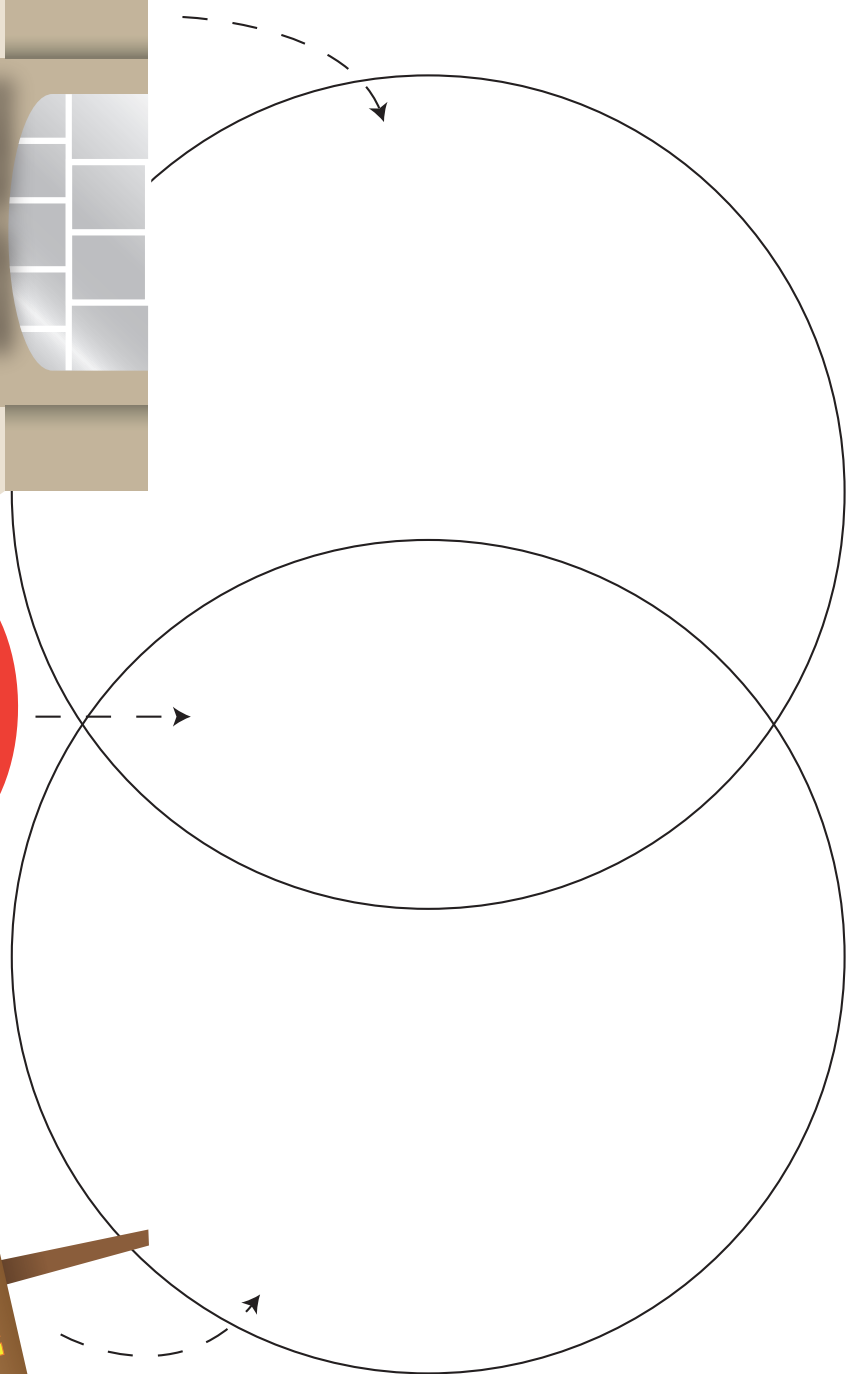
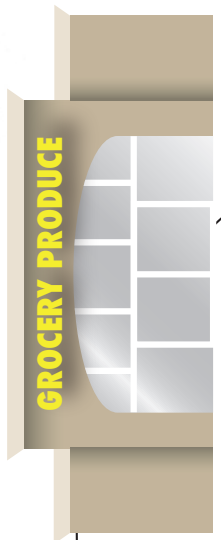
1. Instruct students to write down a quick inventory of what is available in the garden.
2. Once back inside give students, or small groups of students, copies of local grocery store sales papers. Have them complete the Venn diagram worksheet of fruits and vegetables in the garden, and fruits and vegetables in the grocery store.
3. Give students computer access to see what season the grocery store produce can be grown locally, if possible (remind students that some fruits and vegetables might be from the tropics. Ask them to use the computer research to answer the questions on the Venn diagram worksheet.

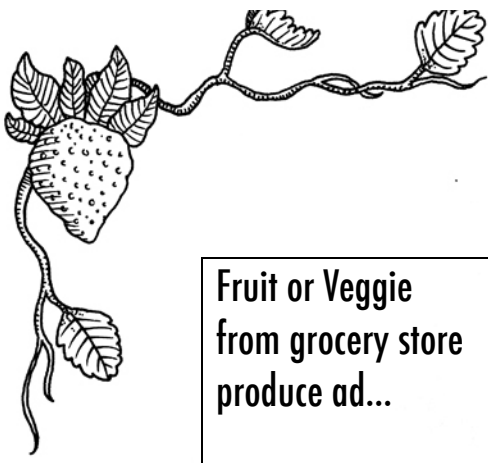


Check for Understanding

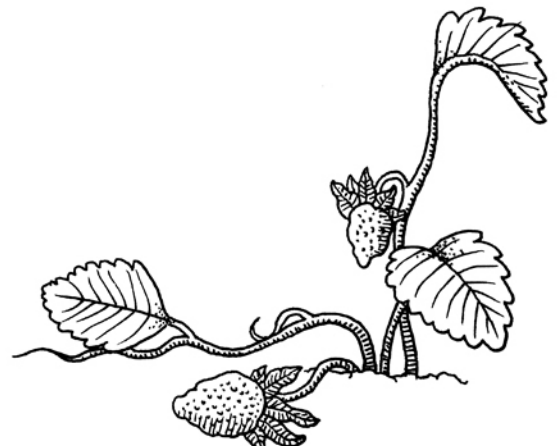
Allow students to share their findings from the worksheet.
Evaluate for understanding of how the tilt of the earth affects seasons.

What's In Season?





Fruit or Veggie from grocery store produce ad...	Can it be grown here? In what season would it be ripe?	Was a country of origin listed in the ad? If so, which?	Name a country where this could be in season now...





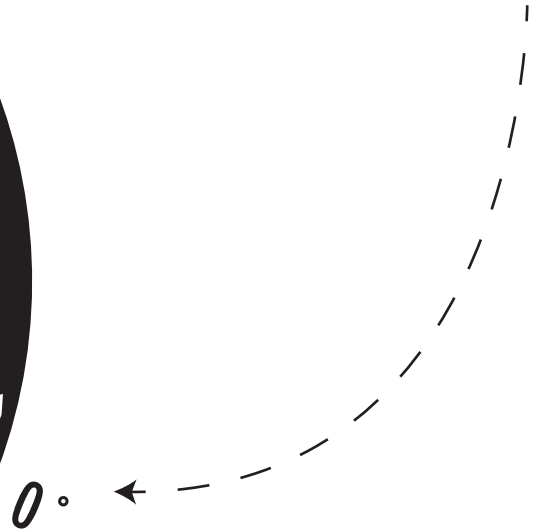
North Pole



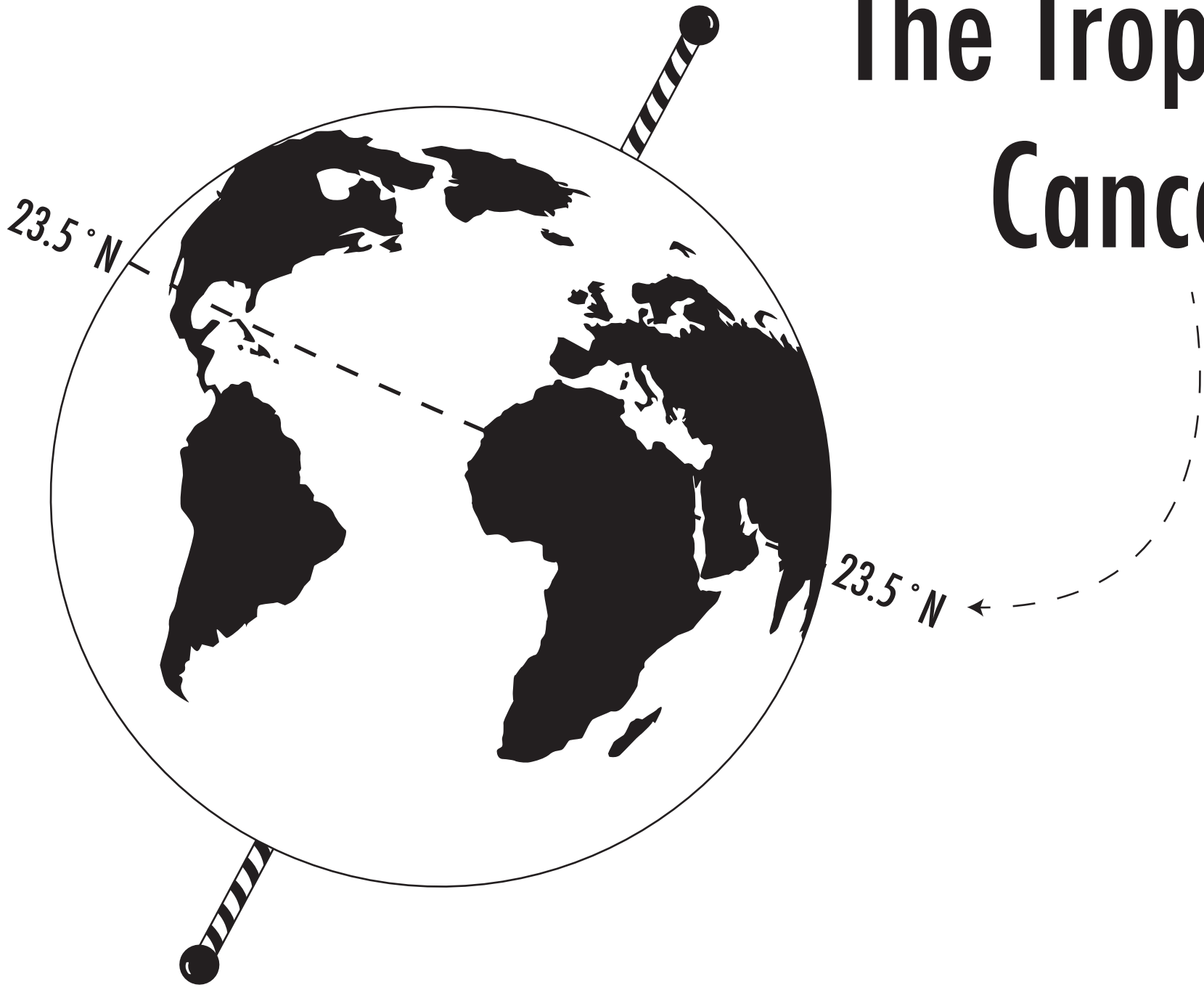
South Pole



The Equator



The Tropic of Cancer



The Tropic of Capricorn

