

Change Signals

Track how organisms respond across different time scales.

LS.8.a "organisms respond to daily, seasonal, and long-term changes;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each environmental change, circle the organism's response, and number the pairs 1 for daily, 2 for seasonal, or 3 for long-term change.

Three Kinds of Change

- ① Each evening, a kangaroo rat leaves its burrow in the desert. As sunlight fades, the air cools and predators that hunt by sight have more trouble finding it. The rodent searches for seeds at night, then spends the hottest daylight hours underground. This behavior is a response to a daily pattern, the regular shift from light and heat to darkness and cooler temperatures. Staying below ground also reduces water loss for the animal in a dry habitat.
- ② In late summer, many eastern monarch butterflies sense shortening days and cooler temperatures. Instead of remaining in northern breeding areas through winter, they begin a southward migration. The butterflies that reach central Mexico cluster in forest sites, where conditions are less severe than those in much of the northern United States and Canada. In spring, monarchs move north or their descendants do, following the return of warmer weather and milkweed plants. Migration helps the population meet seasonal changes in food and temperature.
- ③ Over many generations, organisms can respond to long-term environmental change through changes in a population. On the Galapagos island of Daphne Major, periods of drought left mostly large, hard seeds. Medium ground finches with deeper, stronger beaks were more likely to crack these seeds and survive. They produced offspring, so the average beak size in the population increased after the drought. An individual finch did not change its own beak. The population changed over generations as natural selection acted.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What daily environmental changes cause the kangaroo rat to leave its burrow, and what does it do?

2 What two seasonal signals do eastern monarchs sense before they migrate south?

3 How does clustering in central Mexico help monarch butterflies respond to winter conditions?

4 Why is the finch example a long-term response instead of a response by one individual?

3 YOUR TURN _____ Your own words

Choose one organism. Complete the table with one daily, one seasonal, and one long-term environmental change, along with an accurate response that could help the organism or its population survive.

TIME SCALE	ENVIRONMENTAL CHANGE	RESPONSE AND BENEFIT

PART 1 • READ AND MARK

Underline each environmental change, circle the organism's response, and number the pairs 1 for daily, 2 for seasonal, or 3 for long-term change. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What daily environmental changes cause the kangaroo rat to leave its burrow, and what does it do?	Fading sunlight brings darkness and cooler air. The kangaroo rat leaves its burrow to search for seeds at night.
2	What two seasonal signals do eastern monarchs sense before they migrate south?	They sense shortening days and cooler temperatures.
3	How does clustering in central Mexico help monarch butterflies respond to winter conditions?	The forest sites in central Mexico have less severe conditions than much of the northern United States and Canada, helping monarchs avoid harsher winter weather.
4	Why is the finch example a long-term response instead of a response by one individual?	Finches with deeper, stronger beaks survived and produced offspring during drought. Over generations, the population's average beak size increased, but no individual finch changed its own beak.

PART 3 • YOUR TURN (SAMPLE ANSWER)

TIME SCALE	ENVIRONMENTAL CHANGE	RESPONSE AND BENEFIT
Daily	Daylight and darkness	Dandelion flowers open in daylight and close at night, which exposes them to daytime pollinators.
Seasonal	Winter cold followed by spring warmth	Seeds remain dormant through winter and germinate when spring conditions improve.
Long-term	Many generations of drier conditions	Dandelions with inherited drought-tolerant traits may leave more offspring, making the population better suited to dry conditions.

Accept equivalent descriptions that correctly connect a change to an organism response. For the long-term row, look for a population-level change over generations, not a trait change within one individual.