TERRESTRIAL HI-LO HUNT

BIO KEY

Bio-technique
Microclimates
Comparing

OVERVIEW

The youngsters search for the warmest and coolest, windiest and calmest, wettest and driest, and brightest and darkest spots in an area. The youngsters also look for differences between the plants and animals that live in the Hi-Lo spots.

BACKGROUND

All plants and animals are influenced by ***environmental factors*** such as moisture, temperature, wind, light, and other plants and animals. This activity focuses on moisture, temperature, wind, and light, which change from season to season, day to day, and even hour to hour. The constant shifting of climate causes organisms (plants and animals) to make adjustments such as burrowing or moving to another site, turning their leaves, or drinking or using more water. In short, no single spot is perfect for any one organism at all times of the year, month, or even day.

The contour of the land, the presence or absence of surrounding plants, the moisture level, and the time of day result in many small climates (microclimates) within a lawn, field, or forest. How much variation there is at any one time is the topic of this activity. Comparing the plants and animals that live in different microclimates can help youngsters become more aware of why organisms live where they do.

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CHALLENGE: INVESTIGATE THE HI-LO EXTREMES OF TEMPERATURE, WIND, LIGHT, AND MOISTURE IN YOUR STUDY SITE.

MATERIALS

For each team of four:

1 light meter*†
1 wind meter*†
1 Celsius thermometer*
1 pencil
1 brown paper towel*
1 set of the four Action Cards
1 copy of each side of the "Hi-Lo Meters" Equipment Card
8 Hi-Lo markers*: popsicle or other sticks with 3" x 5" cards attached (four marked "Hi" and four marked "Lo")

For the group:

1 "Hi-Lo Meters" Equipment Card*
1 sheet of Action Cards*
1 sheet of "Light Meter Scales" cutouts*

*Available from Delta Education.
†See the "Hi-Lo Meters" Equipment Card for instructions on making your own meters.

PREPARATION

Group Size. You will need a *minimum* of four students for this activity.

Time. Plan on forty to sixty minutes for this activity.

Site. Select a site such as a yard, vacant lot, or schoolyard, containing some trees or bushes.

Materials. Gather the supplies you will need, and duplicate both sides of the Equipment Card and the Action Cards for the youngsters. Construct one light meter and one wind meter to be used as models by the teams when they construct their own. (Do not cut up your only insert for this or you will not be able to make copies for the children. You may, however, cut out the light meter scales from the sheet provided.)

ACTION

Introducing the Hunt

1. Take the group to the study site.

2. Introduce "The Hunt" by telling the youngsters to look around and spot some places they think are warm, cool, windy, calm, wet, dry, bright, or shady.

3. Introduce the term ***environmental factors*** to describe physical features of an environment that change, such as

temperature, wind, moisture, and light. Tell the youngsters that they will look for the highest and lowest wind speeds; brightest and darkest, driest and wettest, and warmest and coolest spots in the area.

4. Point out the boundaries of the study site.

5. Show the youngsters how to use the thermometer, light meter, and wind meter. (See the Equipment Card.)

6. Explain the use of the brown paper towel for the moisture test.

- Touch or rub the towel on soil, leaves, or grass, or let an animal crawl on it.
- If any part of the towel darkens, there is moisture at that spot. For very wet ground spots, the youngsters can count the drops of water from squeezed soil.

7. Divide the group into teams of four.

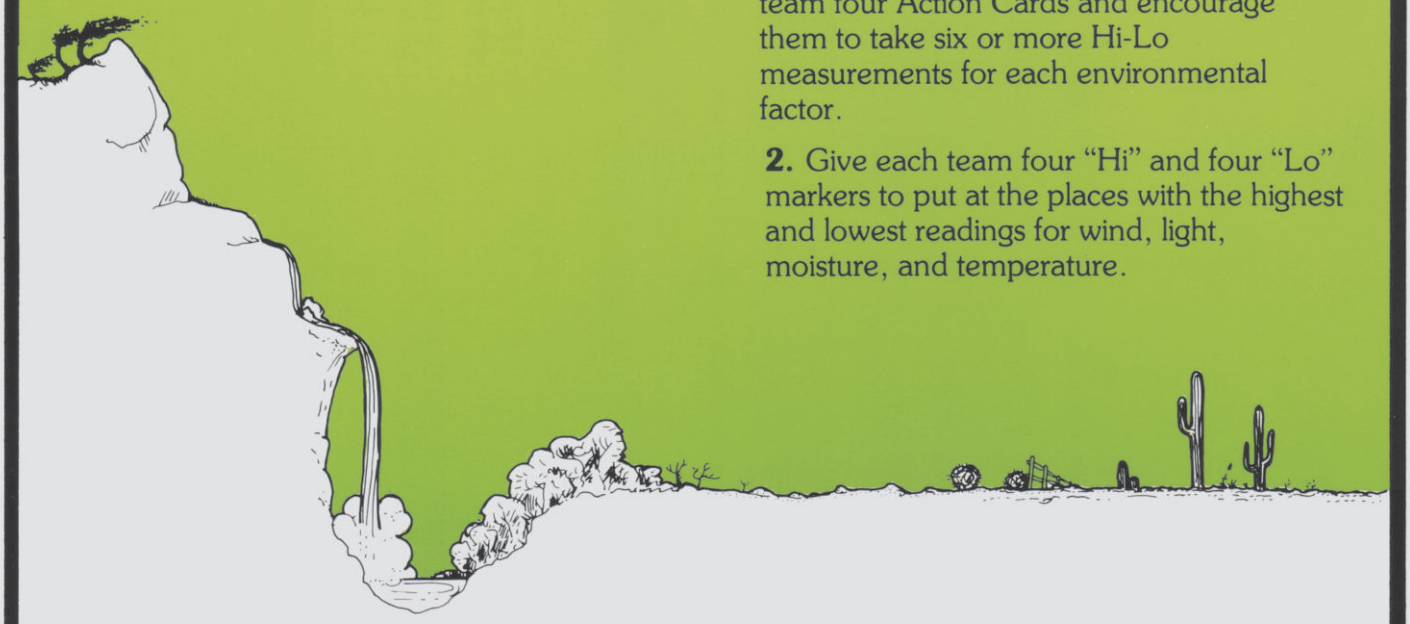
8. Point out the materials for making the wind and light meters, and distribute copies of the Equipment Card to each team.

9. Let the teams construct their meters. Answer any questions the youngsters may have about the operations of the meters.

The Hunt

1. As soon as the teams complete their meters and understand how to measure wind speed and light intensity, give each team four Action Cards and encourage them to take six or more Hi-Lo measurements for each environmental factor.

2. Give each team four "Hi" and four "Lo" markers to put at the places with the highest and lowest readings for wind, light, moisture, and temperature.



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3. Suggest to the youngsters that they look at and compare the plants and animals around the different Hi and Lo markers. Let them get the materials they need and send them off "a-hunting."

After the Hunt

After all the teams have placed their Hi-Lo markers, gather the entire group and remind them that temperature, light, moisture, and wind are called ***environmental factors.*** These factors affect how and where plants and animals live. Also explain to the youngsters that each environmental factor has a range (e.g. highest temperature to the lowest temperature found—38° C to 17° C = a range of 21°C).

Take the group to the various Hi-Lo markers, and raise the following questions:

1. What might be making this spot the (brightest, warmest, wettest, etc.)?

2. How do the Hi and Lo spots relate to each other? Are bright spots also warm? Are moist spots also cool?

3. What plants and animals did you notice living here? Did you notice any differences between the plants and animals that live in any of the Hi-Lo spots? What were the differences?

4. How might the direction or the speed of the wind affect plants and animals?

5. How might the Hi's and Lo's change during the day? How might these changes affect the plants or animals?

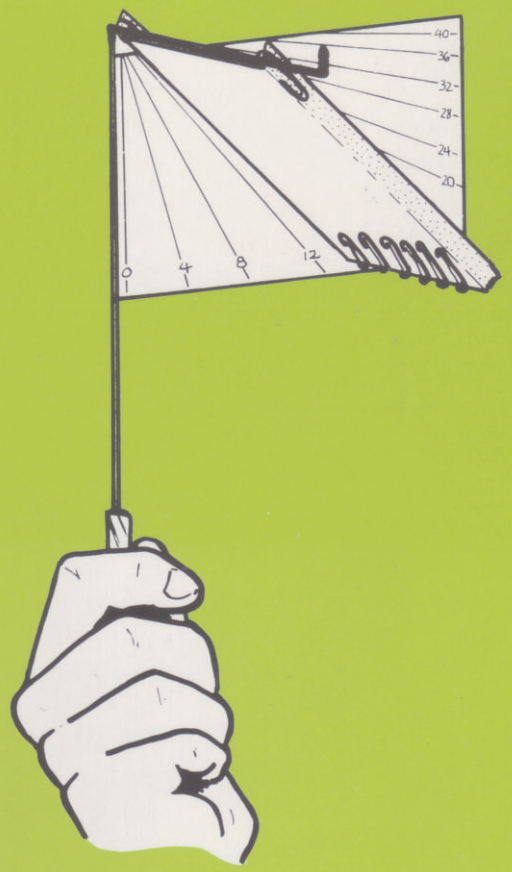
6. What ranges of each environmental factor would you select today if we wanted to rest and eat lunch here? Could our eating lunch at that spot change the environmental factors for any plants or animals? How?

FOLLOW THROUGH

1. For an interesting comparison, conduct the activity again at a different time of day, on another day, or during a different season.

2. Measure the changes that occur from early morning through late evening.

3. Select a site with different characteristics (asking the group to describe the differences), and compare the ranges of environmental factors in the two sites. If you have just studied a lawn, you might want to try a dense wooded area, bare soil, pavement, or a meadow.



Terrestrial Hi-Lo Hunt
HI-LO METERS
Equipment Card

WIND METER

MATERIALS FOR ONE WIND METER:
clear tape (magic is best)
1 pair of pliers
½ metal coat hanger
1 ruler
1 pair of wire cutters (or precut hangers to 28-cm lengths)
½ plastic soda straw
8 paper clips
2 3" x 5" cards

Note: Constructed wind meters are available from Delta Education.

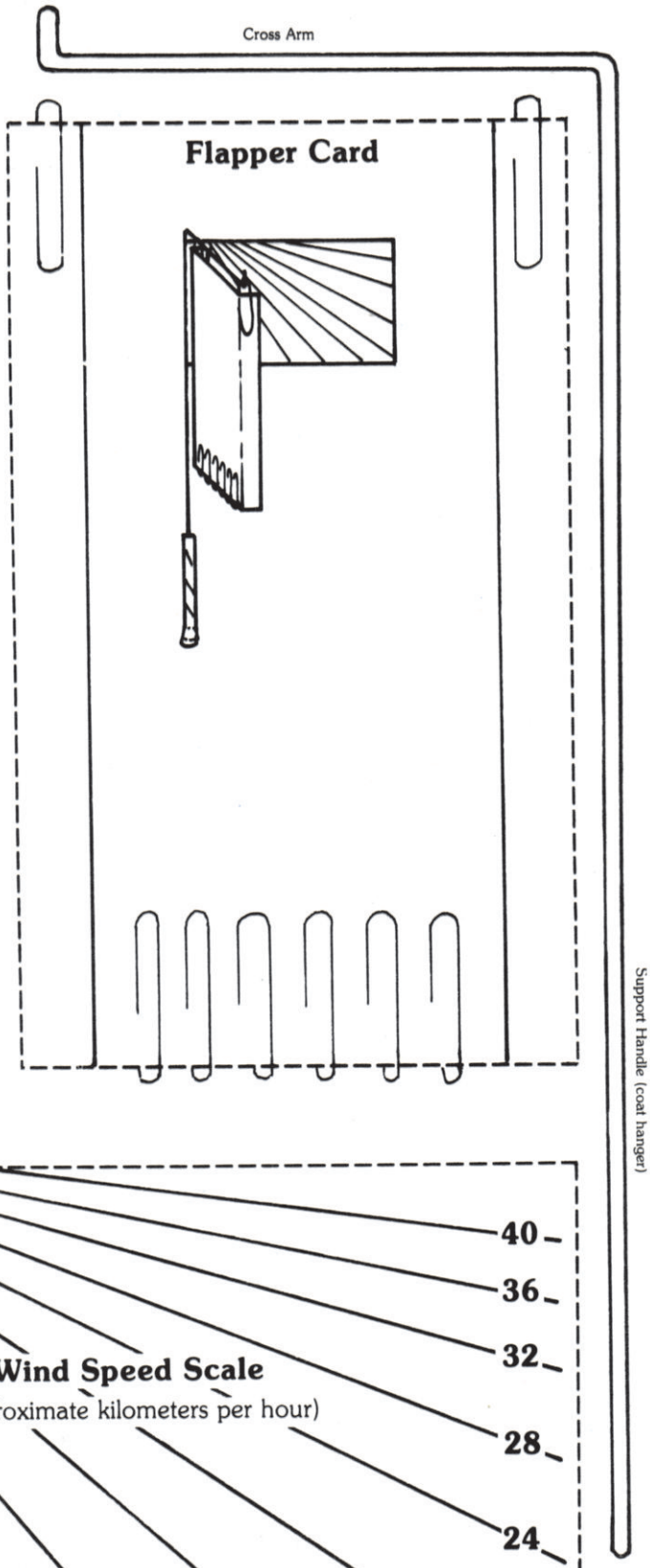
ASSEMBLING YOUR METER (using a copy of these plans):

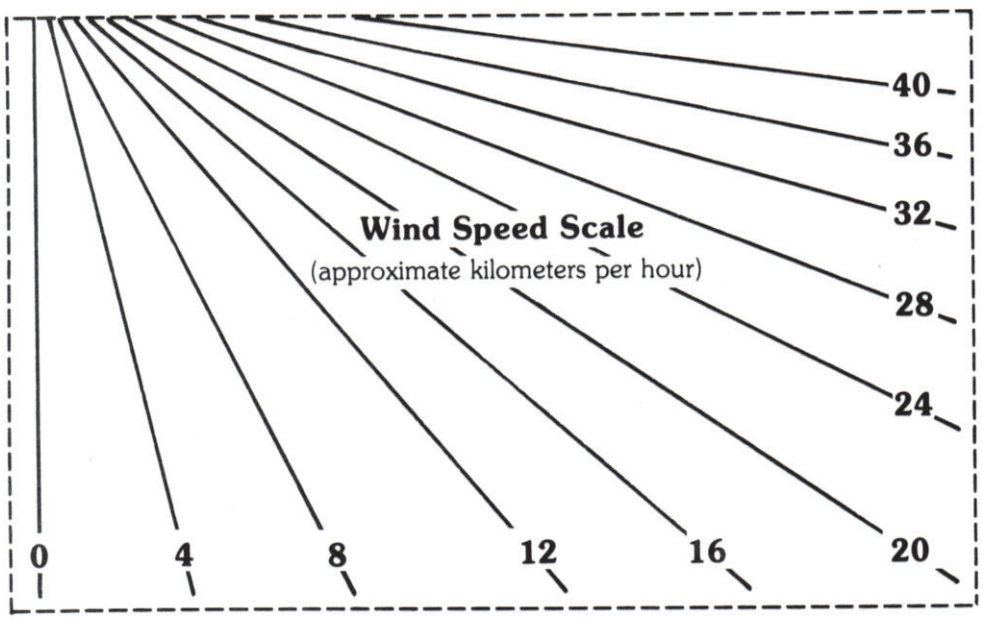
1. Cut out the two cards along the dashed lines.
2. Tape each cutout to a 3" x 5" card.
3. Using a ruler as a folding guide, crease the Flapper Card along the two solid lines so the thin folds will stay straight out.
- Put one paper clip on each of these folds (as illustrated).

4. Cut and bend a coat hanger so it matches the drawing on this sheet.
- With the handle flat on a surface, hold the cross arm straight up.
- Now tape the Wind Speed Scale card to the handle as illustrated.

5. Slip the two paper clips holding the Flapper Card onto the cross arm so the thin folds point toward the numbers on the scale.
6. Make a swivel handle.
- Cut a straw in half.
- Pinch and fold over about 2 cm of one end, and tape it to the longer section.

7. Insert the handle of the wind meter into the open end of the straw and hold the straw in your hand. Keep the handle straight up and down! The wind should pivot the meter so the flapper swings along the scale. Using a pencil or a stick, you can dig a small hole in the soil and put the soda straw swivel in the hole so the meter will stand by itself.





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MATERIALS FOR ONE LIGHT METER:

clear tape (magic is best)
1 sheet of black construction paper*
1 ruler
1 light meter tube pattern (on this sheet)
1 light meter scale (from "Light Meter Scale" sheet)

* Available from Delta Education.

Note: Constructed light meters are available from Delta Education.

ASSEMBLING YOUR LIGHT METER:

1. Cut out the pattern of the light meter tube along the dashed lines.

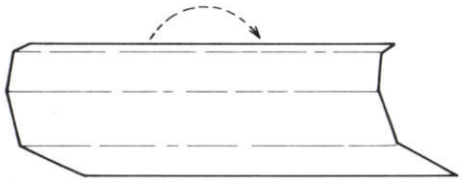
2. Using your cutout as a pattern, trace the tube and cut it out of the black paper.

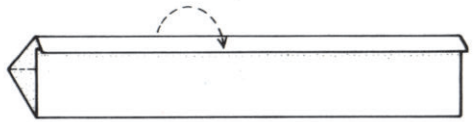
3. Mark the black paper for folding along the solid lines (or place the pattern over the black paper and use it as a folding guide).

4. Using a ruler as a folding guide, fold the black paper into a triangular tube, and tape the outer flap in place.

5. Get a light meter scale from your teacher, and fold the scale along the three solid lines. Attach the scale to the end of the black tube so that the numbers face into the tube and the flaps are outside the tube.

Close up any light leaks with black paper and tape.



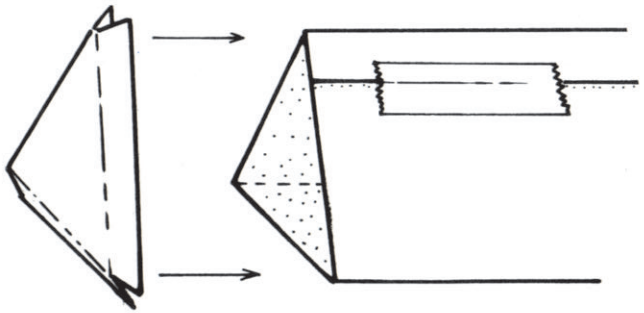


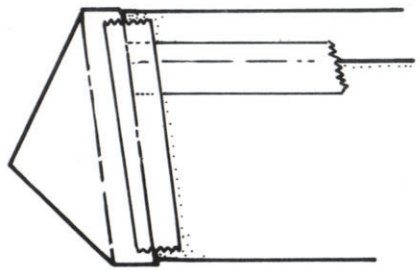
This is an overflap. Tape it to the opposite flap.

USING YOUR LIGHT METER:

1. Hold the light meter at the open end, at *arm's length*, and look into the open end.

2. Standing no more than four meters away, point the meter at the area you want to measure for light, and look for the highest of the five numerals that you can see. For example, if you can see the 1 and 2 but not the 3, 4, or 5, then the light reading for that spot is 2.





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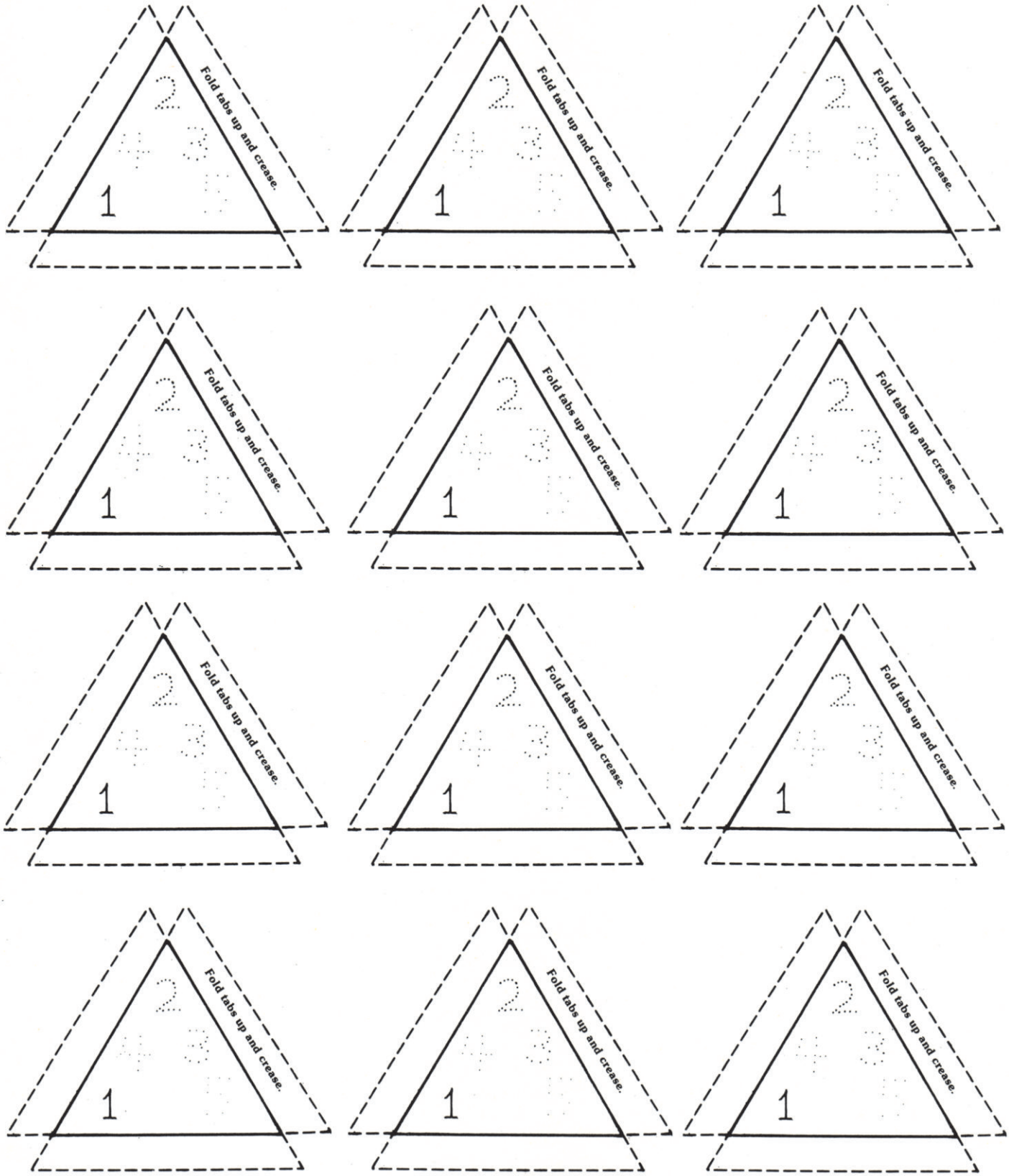
OUTDOOR BIOLOGY INSTRUCTIONAL STRATEGIES

Terrestrial Hi-Lo Hunt
LIGHT METER SCALES

Cut the scales out of this sheet by cutting along the dashed lines. (Copies will not produce scales of high enough quality.) Give one scale to each team.



OUTDOOR BIOLOGY INSTRUCTIONAL STRATEGIES

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Terrestrial Hi-Lo Hunt
Action Card

Temperature. Use a thermometer to find the warmest and coolest spots in this site.

Temp. °C	Location
1.	
2.	
3.	
4.	
5.	
6.	

After you have finished taking temperature measurements, mark the warmest and coolest spots with your Hi-Lo markers.

Terrestrial Hi-Lo Hunt
Action Card

Wind. Use your wind meter to find the windiest and calmest spots in this site.

Wind Speed	Location
1.	
2.	
3.	
4.	
5.	
6.	

After you have finished taking wind measurements, mark the windiest and calmest spots with your Hi-Lo markers.

Terrestrial Hi-Lo Hunt
Action Card

Moisture. Use small strips of brown paper towel to find the wettest and driest spots in this site.

Moisture Level

	Lo	2	3	4	Hi	Location
1.						
2.						
3.						
4.						
5.						
6.						

After you have finished taking moisture measurements, mark the wettest and driest spots with your Hi-Lo markers.

Terrestrial Hi-Lo Hunt
Action Card

Light. Use a light meter to find the brightest and darkest spots in this site.

Light (highest number you can see)	Location
1.	
2.	
3.	
4.	
5.	
6.	

After you have finished taking light measurements, mark the brightest and darkest spots with your Hi-Lo markers.

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