



Discovering Tidal Pools

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Topic

Environmental conditions and population distribution of organisms in tidal pools



Time

1½ hours



Safety

Adult supervision is required. Please click on the safety icon to view the safety precautions. Wear sneakers or boots to ensure good footing on slippery rocks.

Materials

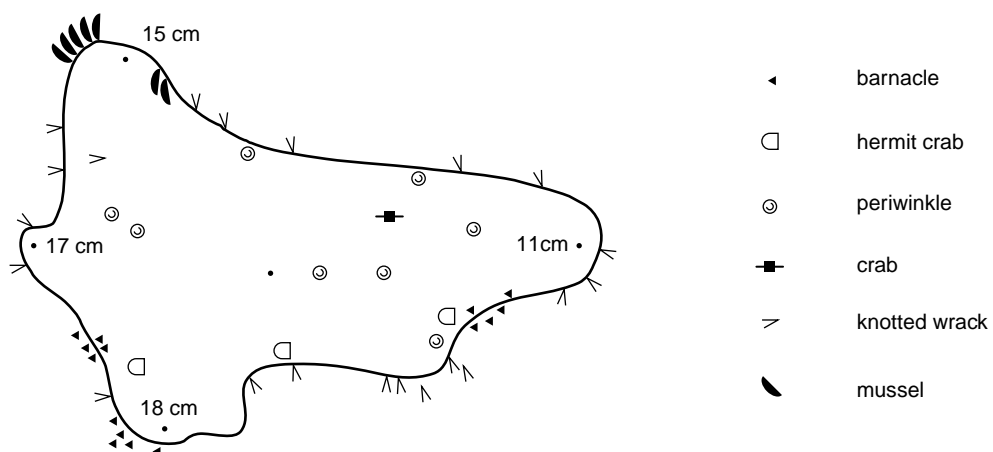
ruler
hydrometer
thermometer

dip net
collecting jars or bags
field guide to marine life

Procedure

Plan to do this experiment at low tide. Make three additional copies of the data table and bring them with you.

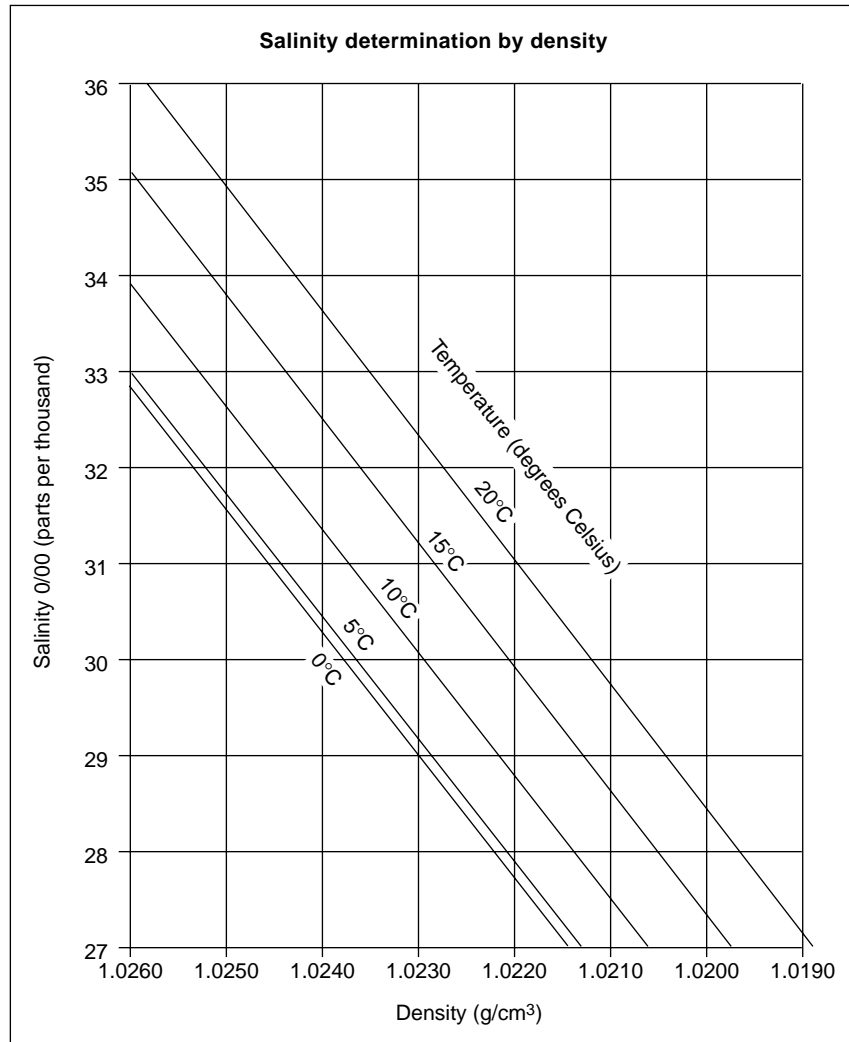
1. Choose a tidal pool near the waterline. On a plain piece of paper, draw a diagram of its outline (see illustration).



Using your ruler, measure the depth at various places in the pool. Be sure to include the middle and four points on the edges. Record these measurements on your diagram and on a data table like the one shown below.

DATA TABLE	
Tidal pool _____	
Location _____	
Center depth _____	
Side depths _____, _____, _____, _____	
Temperature _____	
Specific gravity _____	
Salinity _____	
Name of organism _____	Number found _____
_____	_____
_____	_____
_____	_____
_____	_____

2. Using the hydrometer, measure the specific gravity (density) of the water in the tidal pool, and record it on the data table.
3. Using the thermometer, measure the temperature of the pool, and record it on the data table.
4. Refer to the graph “Salinity determination by density,” and determine the salinity of the pool you are studying by using your data on temperature and specific gravity. Record this information on your data table.
5. Collect plant and animal specimens from your pool. Use your field guide to identify them, and list them on your data table. Sketch the location of these samples on your diagram of the tidal pool. On your data table, indicate the approximate quantity of each specimen present.
6. Return all specimens to their original homes.
7. Repeat the above steps with two additional tidal pools. Choose one that is near the high-tide mark and one that is halfway between the pools near the waterline and the high-tide mark.
8. In writing, discuss the relationships you have found in the three tidal pools you have studied. Try to draw some conclusions concerning salinity, temperature, and type of organisms found.



What's Going On

Conditions in tidal pools vary depending on a number of factors such as depth and distance from the waterline. For example, tidal pools close to the high-water mark will be warmer and more saline than those near the waterline because they have been exposed to the sun for a longer period. More time is available for the heat of the sun to evaporate and warm the water. The temperature of tidal pools in general is higher than that of the ocean because the sun is heating a smaller volume of water. Organisms found in tidal pools also vary with conditions.

Connections

Tidal pools are shallow pools of water left behind by the outgoing ocean tide. Marine life that would otherwise not be found above the low-tide line thrives in tidal pools. Depending on their location, size, and depth, tidal pools may vary considerably in temperature and salinity. In this project, you observed the characteristics of some tidal pools and the life they support.

Safety Precautions

READ AND COPY BEFORE STARTING ANY EXPERIMENT

Experimental science can be dangerous. Events can happen very quickly while you are performing an experiment. Things can spill, break, even catch fire. Basic safety procedures help prevent serious accidents. Be sure to follow additional safety precautions and adult supervision requirements for each experiment. If you are working in a lab or in the field, do not work alone.

This book assumes that you will read the safety precautions that follow, as well as those at the start of each experiment you perform, and that you will *remember* them. These precautions will not always be repeated in the instructions for the procedures. It is up to you to use good judgment and pay attention when performing potentially dangerous procedures. Just because the book does not always say “be careful with hot liquids” or “don’t cut yourself with the knife” does not mean that you should be careless when simmering water or stripping an electrical wire. It *does* mean that when you see a special note to be careful, it is extremely important that you pay attention to it. If you ever have a question about whether a procedure or material is dangerous, stop to find out for sure that it is safe before continuing the experiment. To avoid accidents, always pay close attention to your work, take your time, and practice the general safety procedures listed below.

PREPARE

- Clear all surfaces before beginning work.
- Read through the whole experiment before you start.
- Identify hazardous procedures and anticipate dangers.

PROTECT YOURSELF

- Follow all directions step by step; do only one procedure at a time.
- Locate exits, fire blanket and extinguisher, master gas and electricity shut-offs, eyewash, and first-aid kit.
- Make sure that there is adequate ventilation.
- Do not horseplay.
- Wear an apron and goggles.
- Do not wear contact lenses, open shoes, and loose clothing; do not wear your hair loose.
- Keep floor and work space neat, clean, and dry.
- Clean up spills immediately.
- Never eat, drink, or smoke in the laboratory or near the work space.
- Do not taste any substances tested unless expressly permitted to do so by a science teacher in charge.

USE EQUIPMENT WITH CARE

- Set up apparatus far from the edge of the desk.
- Use knives and other sharp or pointed instruments with caution; always cut away from yourself and others.
- Pull plugs, not cords, when inserting and removing electrical plugs.
- Don’t use your mouth to pipette; use a suction bulb.
- Clean glassware before and after use.
- Check glassware for scratches, cracks, and sharp edges.
- Clean up broken glassware immediately.

- Do not use reflected sunlight to illuminate your microscope.
- Do not touch metal conductors.
- Use only low-voltage and low-current materials.
- Be careful when using stepstools, chairs, and ladders.

USING CHEMICALS

- Never taste or inhale chemicals.
- Label all bottles and apparatus containing chemicals.
- Read all labels carefully.
- Avoid chemical contact with skin and eyes (wear goggles, apron, and gloves).
- Do not touch chemical solutions.
- Wash hands before and after using solutions.
- Wipe up spills thoroughly.

HEATING INSTRUCTIONS

- Use goggles, apron, and gloves when boiling liquids.
- Keep your face away from test tubes and beakers.
- Never leave heating apparatus unattended.
- Use safety tongs and heat-resistant mittens.
- Turn off hot plates, bunsen burners, and gas when you are done.
- Keep flammable substances away from heat.
- Have a fire extinguisher on hand.

WORKING WITH MICROORGANISMS

- Assume that all microorganisms are infectious; handle them with care.
- Sterilize all equipment being used to handle microorganisms.

GOING ON FIELD TRIPS

- Do not go on a field trip by yourself.
- Tell a responsible adult where you are going, and maintain that route.
- Know the area and its potential hazards, such as poisonous plants, deep water, and rapids.
- Dress for terrain and weather conditions (prepare for exposure to sun as well as to cold).
- Bring along a first-aid kit.
- Do not drink water or eat plants found in the wild.
- Use the buddy system; do not experiment outdoors alone.

FINISHING UP

- Thoroughly clean your work area and glassware.
- Be careful not to return chemicals or contaminated reagents to the wrong containers.
- Don't dispose of materials in the sink unless instructed to do so.
- Wash your hands thoroughly.
- Clean up all residue, and containerize it for proper disposal.
- Dispose of all chemicals according to local, state, and federal laws.

BE SAFETY-CONSCIOUS AT ALL TIMES