

## Cells outline

### **Goal**

Cells are the small units of living things, and cells have particular structures that underlie their functions.

### **Key concepts**

1. All living things are composed of cells
2. Cells are made up of several components that perform different functions
3. Cells can specialize to perform specific tasks

### **Probe**

Hand out the “Is It Made of Cells?” probe from Page Keeley’s “Uncovering Student Ideas in Science, Vol. 1.” Have students work on this probe independently and silently. Give them 3 minutes to do it, shortening as necessary. Have them pair with another student (“Find somebody you haven’t said ‘hello’ to yet today”) and exchange ideas.

- Did your partner mark any items differently than you?
- How do your rules for grouping compare?
- Try to come up with one rule that you can both agree on.

Ask for pairs to share their rules with the class. Keep a list running on the board to record student ideas.

- Were there any materials that gave you difficulty in classifying? How did you deal with them?
- How did you develop your rule?

### **Concept Introduction**

Lecture about the parts of a general cell. Give students a handout with diagram of general cell. As I work through the lecture, have the students color in the diagram piece by piece while they take notes.

### **Application/Assessment**

Talk about specialization.

- Are all the cells in your body identical?
  - Physically vs. genetically identical
- What kinds of specialized cells do you have?

Talk about leaf cells and how they are specialized for photosynthesis. Draw a leaf cell.

- What is the function of a leaf?
- Why are leaves green? Why aren’t tree trunks green?
- What specific steps does a leaf cell need to make to perform its function?
  - Photosynthesize
  - Stay upright
  - Pass food to other parts of the plant
- What pieces are particularly needed to accomplish these steps?
  - Lots of chloroplasts
  - Turgid vacuole and cell walls

- Connections from one cell to the next

Hand out “Make-a-Cell” worksheet. In pairs, have students think about the specific cell type they have been assigned, then draw what they think their cell would look like. On the back side of the page they should also describe how the features they gave their cell help it perform its task. Next, they should find another pair (“Find another partner pair sitting across the room from you”) and trade papers with them. Make sure they do not look on the back of the new paper. The pair should examine the new cell and come up with a situation in which that cell would be very successful. Have the pair write down what they think the cell does in the space at the bottom of the front side of the page. Finally, get the two pairs together to discuss the reasons the drawings were made as they were and why they were interpreted as they were.

- Did the drawings get interpreted similarly to their intended function? Why or why not?
- Is the interpreted function also a reasonable one for the cell?
- If the intended and interpreted functions differed, are there additional changes that could be made to more clearly differentiate the two cells?
- Why are cells specialized? Can a cell perform two functions? Three? How many is too many functions?