Characteristics of Living Things

- Biology is the study of **life**.

But what is life?
What distinguishes living things from nonliving?

- All living things share a set of common characteristics.

What are those common characteristics?

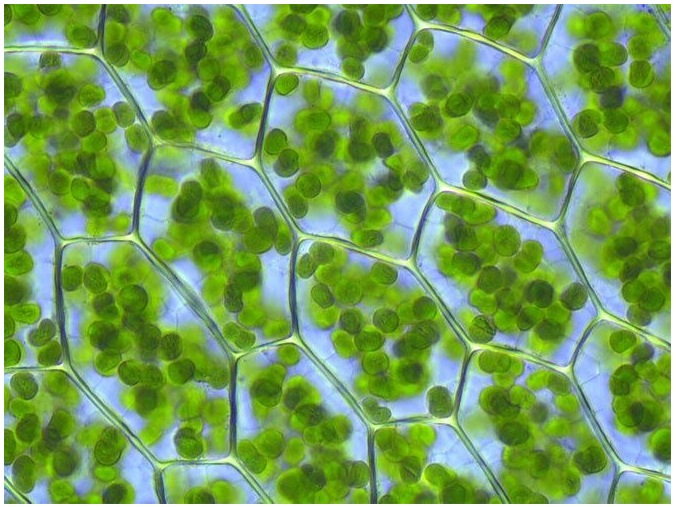
Characteristics of Living Things

1. **Living things are made up of one or more cells—the smallest units considered fully alive.**

- Cells can grow, respond to their surroundings, and reproduce.

- Despite their small size, cells are complex and highly organized.

For example, a single branch of an apple tree contains millions of cells.



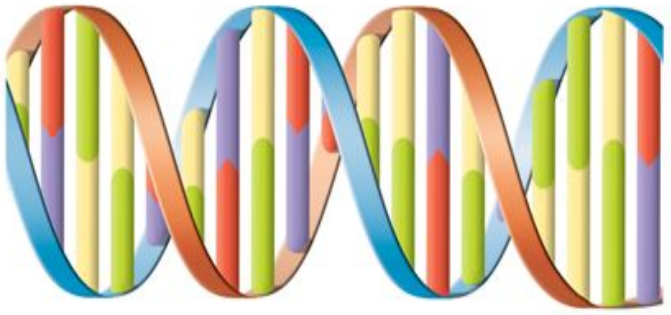
Characteristics of Living Things

2. **Living things are based on DNA, a universal genetic code.**

- All organisms store the complex information they need to live, grow, and reproduce in a genetic code written in a molecule called DNA.

- That information is copied and passed from parent to offspring and is almost identical in every organism on Earth.

For example, the growth, form, and structure of an apple tree are determined by information stored in its DNA



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3. **Living things obtain and use material and energy to grow, develop, and reproduce.**

- The combination of chemical reactions through which an organism builds up or breaks down materials is called **metabolism.**

For example, various metabolic reactions, such as photosynthesis, occur in leaves on an apple tree.

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4. **Living things grow and develop.**

- During development, a single fertilized egg divides again and again.

- As these cells divide, they differentiate, which means they begin to look different from one another and to perform different functions.

For example, an apple tree grows and develops from a tiny seed.

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5. Living things reproduce, which means that they produce new similar organisms.

- Most plants and animals engage in sexual reproduction, in which cells from two parents unite to form the first cell of a new organism.

- Other organisms reproduce through asexual reproduction, in which a single organism produces offspring identical to itself.

For example, beautiful blossoms are part of an apple tree's cycle of sexual reproduction.

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6. **Living things respond to their environment.**

- A stimulus is a signal to which an organism responds.

For example, some plants can produce unsavory chemicals to ward off caterpillars that feed on their leaves.

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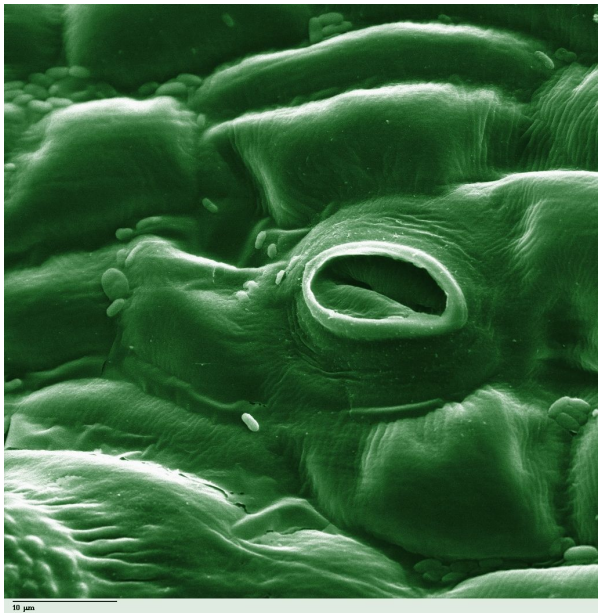
7. **Living things maintain a relatively stable internal environment, even when external conditions change dramatically.**

- All living organisms expend energy to keep conditions inside their cells within certain limits. This process is called homeostasis.

For example, specialized cells help leaves regulate gases that enter and leave the plant.

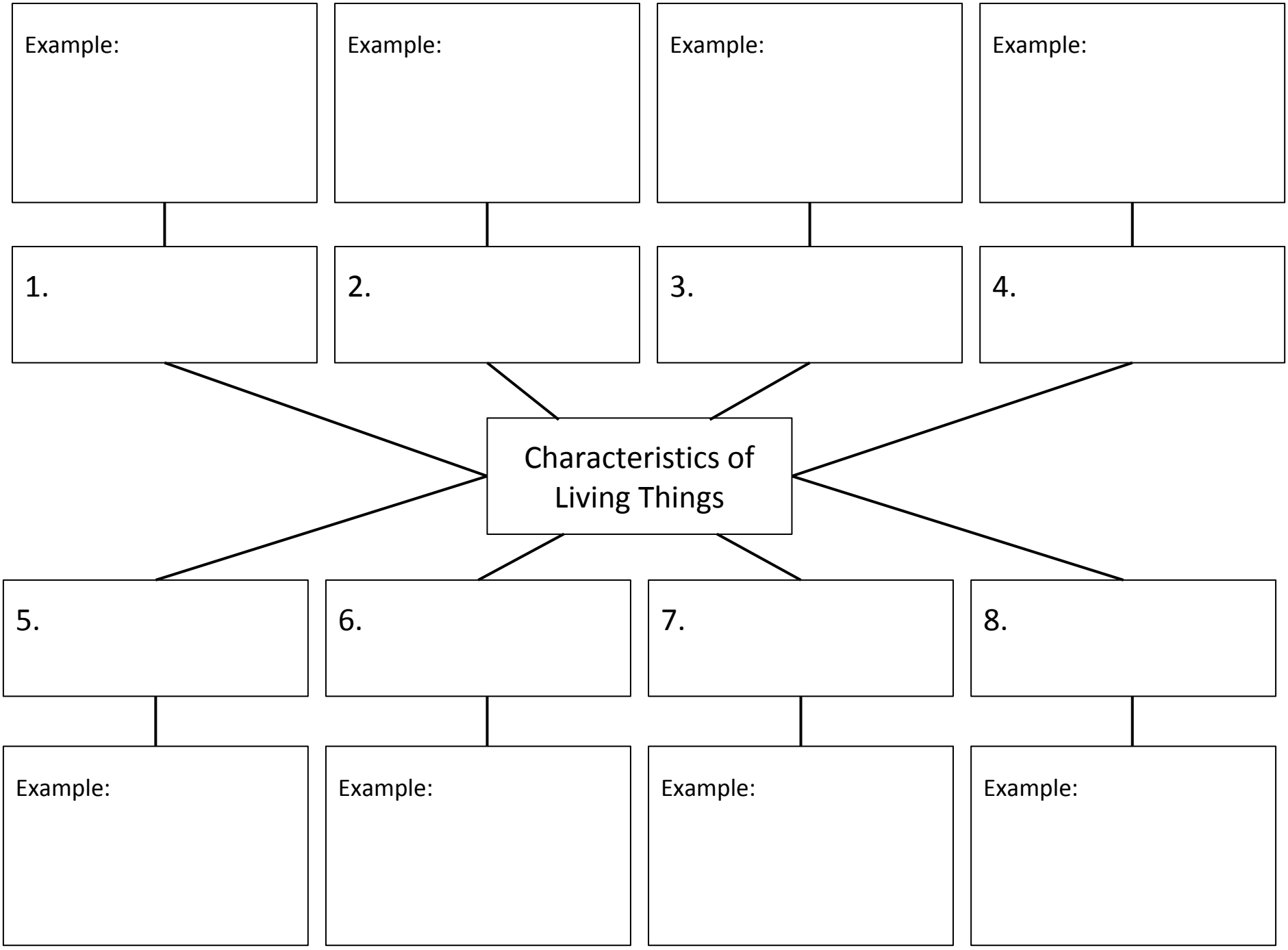


Characteristics of Living Things

8. Over generations, groups of organisms evolve, or change over time.

- Evolutionary change links all forms of life to a common origin more than 3.5 billion years ago.

For example, signs of the first land plants are preserved in rock over 400 million years old.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