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Warm-Up | Tools and Technology

Lesson Question

Lesson Goals

Examine the _____ between science and technology.

Describe the use of _____ in science.

Explain the use of _____ in technology.

Identify the benefits and _____ of using models in science.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

model	a simplified _____ of a real object or system
tangible	easily seen or _____
technology	the application of new methods or devices to _____
probeware	a _____ or other electronic device that is usually handheld and designed to collect, store, and display data

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Science and Society

Science is influenced by the _____ of society.

Science seeks ways to _____ the needs of society.

- Scientists gain new _____.
- Scientists _____ existing products or technology.
- Scientists design and create _____ or technology.

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Slide 2

Science and Technology

_____ is the _____ of new methods or devices to solve problems.

- Aids in _____ and _____ data
- Helps process, store, and communicate _____
- Influences the _____ of scientific knowledge

Observation Tools: Microscopes

Advances in technology have led to the _____ of _____ over time.

Microscope	Magnification Ability
_____ light microscope	400–1,000x
Transmission _____ Microscope	100,000x
_____ electron microscope	500,000x
Scanning _____ microscope	atomic level

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Observation Tools: Telescopes

- _____ first invented in the early 1600s.
- Telescopes allow scientists to _____ their _____ of Earth and the universe.

Observation Tools: X Rays and Ultrasounds

- _____ send x-ray particles through the body and an _____ is recorded on a computer or film.
  - Dense structures, like bones, appear white in the image.
  - Structures that contain air, like several organs, will appear black.
  - Things like muscle, fat, and fluid, will be grayish.
- Other uses for x-rays include X-ray astronomy, X-ray microscopic analysis of very tiny objects, and _____, such as airport scanners that inspect luggage before it is loaded onto aircraft.
- _____ can show image in real-time using sound waves and their echoes.
  - used in medicine to view and monitor a developing baby in a mother's stomach, blood circulation, the inside of the heart, and the kidneys

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Measurement and Calculation Tools

[ ] tools— ruler, thermometer, balance, etc.

Electronic tools— [ ], etc.

- Collect large amounts of data in a short amount of time with greater [ ]
- [ ] quickly and clearly
- Contain software for quick and accurate data [ ]
- [ ] large amounts of [ ] in a very small space

Slide 8

The *Curiosity* Rover

REAL-WORLD CONNECTION

- [ ] November 26, 2011
- Landed on [ ] August 2, 2012
  - [ ] climate and geology
  - Assesses Gale Crater for evidence of once-living [ ]
  - Determines whether [ ] exploration is possible
- [ ] extended in December 2012
- Serves as [ ] for Mars 2020 mission

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The Need for Technology

REAL-WORLD CONNECTION

The increased number of motor vehicles on the road:

- increases _____ .
- produces _____ pollution.
- reduces _____ resources.

The Development of Technology

REAL-WORLD CONNECTION

Hydrogen _____

- Combine _____ and _____ into water, producing _____

The Improvement of Technology

REAL-WORLD CONNECTION

Test driven from San Francisco to Washington, DC

- Needs _____ in real-world conditions

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Slide 10

Driverless Cars

- _____ signals are converted by computer software into data that move a toy car.
- Same signals can be used to help control _____.
- Question of liability when car drives itself.

Slide 16

Models in Science

A _____ is a _____ representation of a real object or system.

They may be representations of things that are:

- Very _____
- Very _____
- Very _____

Benefits of Models

Models make concepts more _____, or easy to see and touch.

- Notice _____
- _____ or revise representations
- Predict or _____ events or relationships

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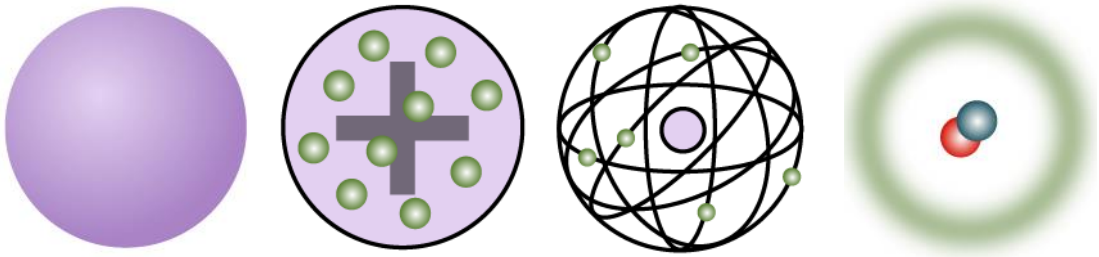
Limitations of Models

- May be _____
- Cannot represent all _____ of object or system
- Are only as accurate as _____ scientific knowledge

The Atomic Model

HISTORICAL TRENDS

The atomic model has _____ due to changes in scientific knowledge.



Early 1800s | Late 1800s | Early 1900s | After 1920s

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Lesson Question

How are tools and technology used in science?

Answer

Slide 2

Review: Key Concepts

Advances in technology allow for the _____ of scientific knowledge.

- _____ tools: microscopes, telescopes, X-rays, and ultrasounds
- _____ and _____ tools: ruler, thermometer, balance, and probeware

Scientific knowledge is used to make _____ in _____

- _____ fuel cell cars
- _____ cars

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Slide 2

Review: Models in Science

A model is a simplified representation of a _____ or _____ that is very large, very small, or very complex.

Benefits	Limitations
• Makes concepts more _____ • Notices _____ • Develops or _____ representations • Predicts or explains _____ or relationships	• May be _____ • Cannot represent _____ of object or system • Are only as accurate as _____ scientific knowledge

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Use this space to write any questions or thoughts about this lesson.

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