

Search for Solutions Teachers' Handout

Following are questions for students to answer as they watch the Search for Solutions video. There are about two questions per video segment. The handout can be printed, distributed and reused by students as the applicable segments are viewed. Due to the constraints of answering questions as students watch the video, these questions stress basic knowledge and comprehension. Articles in the Teaching Guide include post-video activities to address higher levels of learning such as analysis, synthesis and evaluation.

I. Introduction

- _____ 1. The video proposes that science is...
- knowledge itself.
 - the process by which we gain knowledge.
 - proposals that cannot be tested.
- _____ 2. One researcher describes experimentation as...
- testing things to see how they react.
 - an integral part of life.
 - trying to predict something with a model.
 - All of the above.

II. Serendipity, Imagination & Aha!

- _____ 3. Serendipity is...
- the element of chance.
 - a bit of luck.
 - a coincidence.
 - All of the above
- _____ 4. Two different coral species were found to...
- compete with each other.
 - depend upon each other for survival.
 - interbreed despite scientists' expectations.

III. Science & Technology

- _____ 5. A simple viewpoint is that science is know-_____, while technology is know-_____.
- why, how
 - how, why
 - it-all, nothing
- _____ 6. An example of a field where technology blends into science is...
- microscopy.
 - space research.
 - Both A & B

- _____ 7. One researcher gives this name to engineering or the desire to build something:
- artificial intelligence
 - synthetic science
 - analytical science

IV. Exploration, Evidence & Investigation (Part I) Mars

- _____ 8. What parts of Earth remind us of Mars?
- Arctic and Antarctic deserts
 - coniferous forests
 - oceans
 - rainforests

DNA

- _____ 9. The differences between people is attributable to variations in _____ percent of our DNA
- 0.1
 - 10
 - 25
 - 50

Turtle Rodeo

- _____ 10. What was the purpose of the turtle rodeo?
- collecting blood samples for disease analysis
 - tagging to determine the turtle population
 - breeding new turtle species

Weeds

- _____ 11. The weed research involved...
- finding weeds that make good cover crops.
 - identifying organic insecticides.
 - determining which cover crops inhibit weeds.

Simple Organisms

- _____ 12. Identifying which micro-organisms evolved first led scientists to...
- A. search for primitive structures.
 - B. compare gene sequences.
 - C. extract micro-organisms from fossils.

Deep Space

- _____ 13. The chemicals in a distant planet's atmosphere can be determined...
- A. by analyzing the starlight passing through that atmosphere.
 - B. only by sending a probe to sample the atmosphere.
 - C. by examining meteorites.

Penguins

- _____ 14. The penguin research includes determining the _____ of their feeding.
- A. location
 - B. depth
 - C. content
 - D. All of the above

Dino

- _____ 15. The Australian dinosaur dig involved...
- A. training diggers to distinguish bones from rock.
 - B. discovering mammals that lived at the same time as dinosaurs.
 - C. Both A & B

V. Exploration, Evidence & Investigation (Part II)

Climate History

- _____ 16. One researcher says that wind speeds thousands of years ago can be found by measuring the...
- A. cloudiness of an ice core due to dust.
 - B. amount of carbon dioxide in an ice core.
 - C. amount of salt deposited in an ice core.
 - D. thickness of an ice core's clear layer.

Mars

- _____ 17. Most of the rocks in the solar system...
- A. are carbonates.
 - B. contain fossils.
 - C. fizz when exposed to acid.
 - D. None of the above

FBI

- _____ 18. Today some of the most important and powerful forensic evidence comes from...
- A. DNA typing.
 - B. latent fingerprints.
 - C. trace evidence.
 - D. thin-layer chromatography.

Rainforest

- _____ 19. The male rainforest researcher was using the seeds in animal waste to...
- A. study pesticide impacts on animal populations.
 - B. track animal movement.
 - C. classify different plant species.

Stroke Rehab

- _____ 20. The control group in the stroke rehab experiment received...
- A. both standard and robot-assisted therapy.
 - B. only standard physical therapy.
 - C. only robot-assisted therapy.

Dolphins

- _____ 21. Part of determining the size of an animal population is...
- A. observing play behavior.
 - B. communicating with the animals.
 - C. identifying or marking individuals.

VI. Design, Modeling & Prediction (Part I)

Phytoextraction

- _____ 22. What is phytoextraction?
- A. Injecting metals into plants to cause mutations.
 - B. Using plants to add heavy metals to soils.
 - C. Using plants to extract metals from soil.

HUMOSIM

- _____ 23. Ergonomics is the study of the interaction between...
- A. humans and machines.
 - B. the various parts of a machine.
 - C. two or more humans.

Sea Turtle

- _____ 24. What behavior surprised the scientists?
- A. the turtle being territorial about the equipment
 - B. how little food would motivate a turtle
 - C. how standard conditioning did not work on turtles

Climate Modeling

- _____ 25. The researchers use their computer models to analyze the climate in the...
- A. past.
 - B. present.
 - C. future.
 - D. All of the above

Mars

- _____ 26. The Mars rovers behave much like minia ture...
- A. chemists.
 - B. biologists.
 - C. geologists.

- Salmon
- D. physicists.
- _____ 27. The example given for a hydrologist's role in a salmon study was...
- A. fishing.
 - B. measuring water flows.
 - C. examining rock formation changes.
 - D. determining the effect of acid pollution.

VII. Design, Modeling & Prediction (Part II)

Climate History

- _____ 28. Scientists were surprised to find that fundamental climate changes can occur within as short a period of time as two or three...
- A. centuries.
 - B. decades.
 - C. years.
 - D. days.

Deep Space

- _____ 29. Planets orbiting other stars were initially discovered by observing...
- A. the planets directly in a telescope.
 - B. how stars wobbled due to orbiting planets.
 - C. that if our star has planets, so must all other stars.

Rainforest

- _____ 30. The rainforest researcher points out that scientific models usually work best when they are...
- A. as simple as possible.
 - B. as complex as possible.

Wetlands

- _____ 31. The coastal wetlands in Louisiana are sinking and becoming...
- A. dry deserts.
 - B. larger.
 - C. less salty.
 - D. open water.

DNA

- _____ 32. The plant researcher was inducing plant mutations with...
- A. artificial radiation.
 - B. exposure to pesticides.
 - C. ultraviolet light from the sun.

Bugs

- _____ 33. The potato beetle insecticides under study contained...
- A. lead.
 - B. bacteria.
 - C. acid.
 - D. phosphates.

VIII. Application, Adaptation & Design (Part I)

Wetlands

- _____ 34. The death of a cypress swamp is indicated by the lack of...
- A. waterfowl.
 - B. saltwater.
 - C. human occupants.

DNA

- _____ 35. Finding the genes for various disorders...
- A. has led to several quick cures.
 - B. does not indicate the function of the proteins being encoded.
 - C. gives scientists a firm genetic basis for testing a vaccine.

Weeds

- _____ 36. Weeds...
- A. enhance vegetable crops.
 - B. drive off pests.
 - C. help replenish the soil.
 - D. infest cover crops.

Nanotech

- _____ 37. A perfect nanotube would be extremely...
- A. large.
 - B. resistant to heat flow.
 - C. strong.

Climate Modeling

- _____ 38. Scientists believe that global warming...
- A. will lead to more severe weather.
 - B. leads to a wetter climate.
 - C. is primarily due to natural processes.

Volcano

- _____ 39. An impending volcanic event is indicated by...
- A. an increase in seismic activity.
 - B. a change in the gases being released.
 - C. a physical swelling of the volcano.
 - D. All of the above

IX. Application, Adaptation & Design (Part II)

Mars

- _____ 40. Going to Mars is expensive and difficult...
- A. but almost all Mars missions have been successful.
 - B. so Mars probes tend to be small in size.
 - C. and similar in cost to sending something into Earth orbit.

Bugs

- _____ 41. Bacterial insecticides are _____ regular pesticides.
- A. less expensive than
 - B. similar in cost to
 - C. more costly than

A.I.

- _____ 42. The robot in the video has a motion resembling that of a...
- A. human.
 - B. cockroach.
 - C. dog.

Stroke Rehab

- _____ 43. The stroke rehab project showed that...
- A. recovery involved stringing together partial movements.
 - B. standard physical therapy was just as effective as robot therapy.
 - C. robot use led to reduced muscle tone.
 - D. All of the above

X. Explanation, Theory & Argument

Climate History

- _____ 44. The debate over global warming...
- A. includes the question of how much of it is due to greenhouse gases.
 - B. has moved from whether it is happening to whether it is good or bad.
 - C. has to deal with the fact that some areas are cooling while others are warming.
 - D. All of the above

Nanotech

- _____ 45. One "nightmare" scenario in nanotechnology mentioned in the video is...
- A. using it to create a new form of life.
 - B. its use in creating miniature nuclear bombs.
 - C. how it might lead to new forms of disease.

Future

- _____ 46. One scientist predicted that the 21st century will focus on...
- A. chemical science.
 - B. physical science.
 - C. biological science.

Mars

- _____ 47. Finding which substance on Mars would support the search for life there?
- A. uranium
 - B. potassium
 - C. carbon monoxide
 - D. water

Einstein & Newton

- _____ 48. Einstein's theory of gravity showed that Newton's theory of gravity was...
- A. quite wrong.
 - B. a subset of Einstein's more complete theory.
 - C. a false argument that persisted for hundreds of years.
 - D. useless in describing many everyday events.

DNA

- _____ 49. A major concern with DNA research is...
- A. that it is proceeding faster than the development of ethics regarding its use.
 - B. the slow pace in describing animal genomes is hindering cancer research.
 - C. the scarcity of materials needed to analyze DNA samples.

Marine Archeology

- _____ 50. Shipwrecks have an advantage over land archeological sites because...
- A. they are easier to reach than most land sites.
 - B. there are far more shipwrecks than land sites.
 - C. they preserve many biological materials.

Deep Space

- _____ 51. An unsolved mystery mentioned in the video is...
- A. whether there are planets around other stars.
 - B. how the universe's expansion can be accelerating.
 - C. whether Newton's or Einstein's model of the universe is correct.