

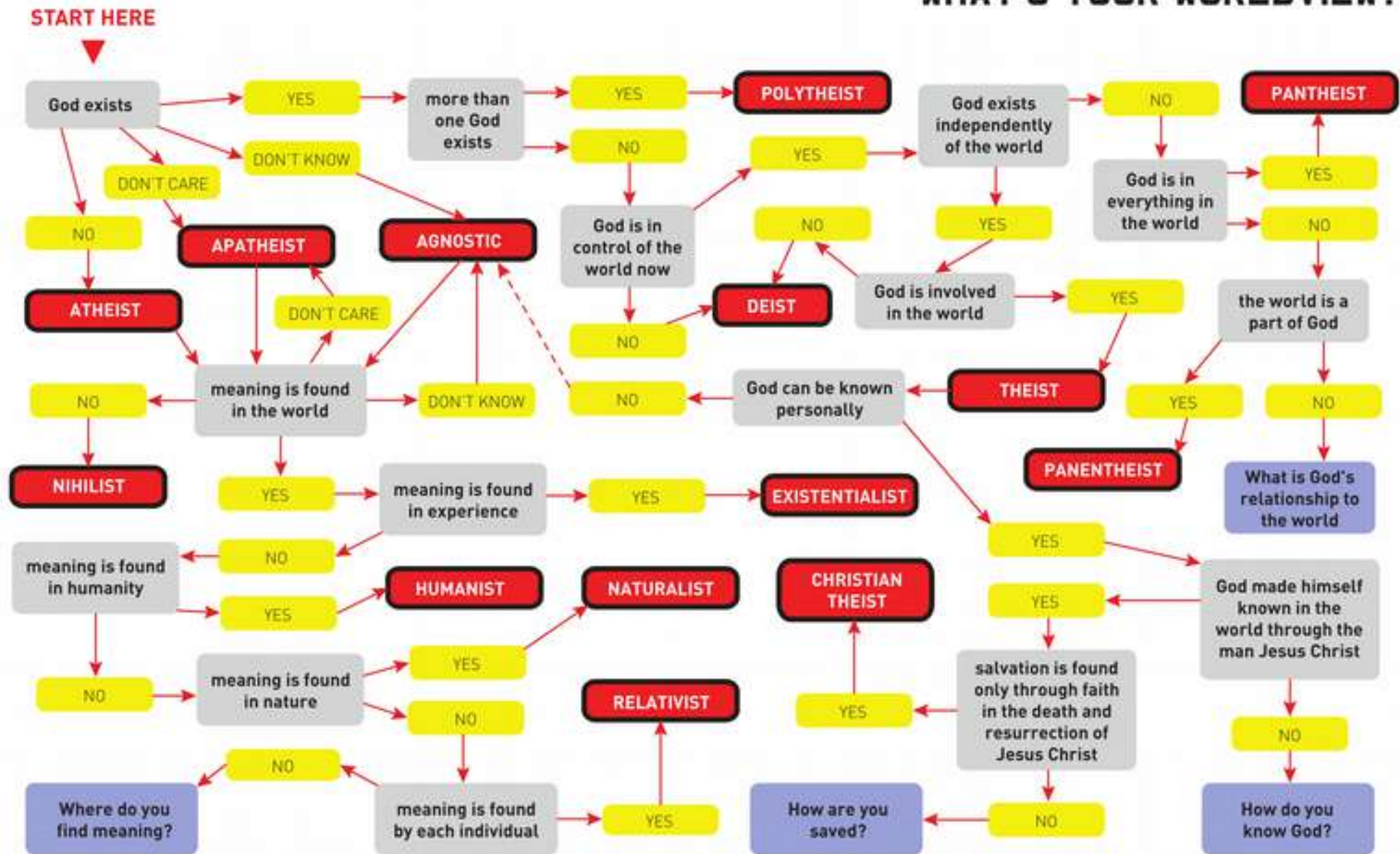
OD ZNANSTVENE KOMPETENCIJE DO ZNANSTVENE SLIKE SVIJETA priča o znanstvenoj metodi

doc. dr. sc. Dario Hrupec

Odjel za fiziku Sveučilišta Josipa Jurja Strossmayera u Osijeku

Tjedan karijera Sveučilišta u Osijeku, 14. svibnja 2019.

WHAT'S YOUR WORLDVIEW?



nekoliko ključnih pojmova:

znanost

znanstvena metoda

činjenica

hipoteza

teorija

zakon

eksperiment

John Ellis

How Science Works:

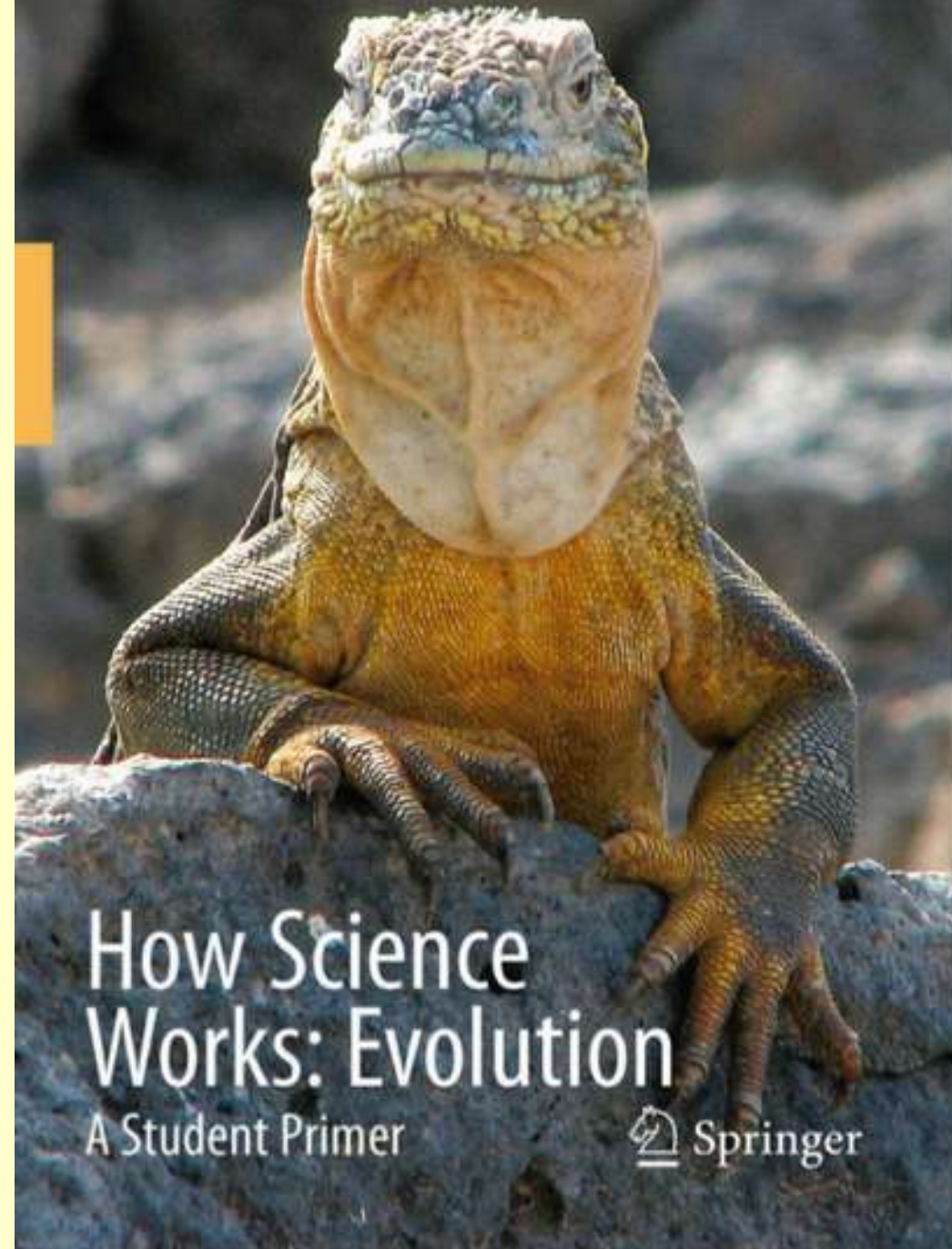
Evolution: A Student Primer

Springer (2010)

\$72

PDF free

John Ellis



Što je uopće (prirodna) znanost?

scientia = znanje

sustavna ljudska djelatnost prikupljanja i organiziranja znanja u obliku **provjerljivih** objašnjenja i predviđanja o svijetu

(1) provjerljivost, (2) ponovljivost, (3) predvidljivost

znanstvena metoda – skup postupaka za istraživanje prirodnih pojava i prikupljanje novih znanja te za ispravljanje i povezivanje prethodnih znanja

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

CONSENSUS STUDY REPORT

Reproducibility and Replicability in Science



u tisku
\$69

PDF free

Što je (znanstvena) teorija?

dosljedni skup ideja
koji objašnjava skup činjenica i
koji je izdržao opovrgljiva predviđanja

činjenica – svakome dostupno
empirijsko opažanje

Što je (znanstvena) hipoteza?

zamišljena ali provjerljiva spekulacija
koja bi mogla objasniti neke činjenice

hipoteza → teorija → zakon

zakon – teorija koja je izdržala
brojne nemilosrdne provjere

Kako nastaje znanstvena teorija?

- (1) postavljanje **pitanja** o nekoj pojavi
- (2) zamišljanje mogućeg objašnjenja
(postavljanje **hipoteze**)
- (3) provjeravanje hipoteze
odgovarajućim **eksperimentom**
- (4) **modificiranje** hipoteze
- (5) **ponovno** provjeravanje
(modificirane) hipoteze

eksperiment -
postupak kojim se
provjerava hipoteza

HOW SCIENCE WORKS

SUMMARY

Source: US National Academy of Sciences

1. Scientists pose, test and revise multiple hypotheses to explain what they observe in the natural world.
2. Scientists use only natural causes to explain natural observations.
3. Science does not prove or conclude; science is always a work in progress.
4. Science is neither democratic nor dogmatic.
5. Scientific claims are subject to peer review and replication.
6. Science is a human endeavour but it cannot make moral or aesthetic decisions.

korak dalje:



A blue banner for the 'Understanding Science' project. On the left is a logo consisting of a central yellow circle with four smaller yellow circles around it, connected by white arrows in a circular path. To the right of the logo, the text reads 'Understanding Science' in large white font, with 'how science really works' in smaller white font below it. Further right, there is a yellow button that says 'SUPPORT THIS PROJECT'. Below this button, the text 'Explore an interactive representation of the process of science.' is written in white. To the right of this text is a small circular graphic with various colored circles and arrows. In the top right corner of the banner, there are links for 'search | glossary | home'. At the bottom of the banner, there are three yellow buttons: 'UNDERSTANDING SCIENCE 101', 'FOR TEACHERS', and 'RESOURCE LIBRARY'.

Understanding Science

<http://undsci.berkeley.edu/>

The Understanding Science site was produced by the UC Museum of Paleontology of the University of California at Berkeley, in collaboration with a diverse group of scientists and teachers, and was funded by the National Science Foundation.

Kako nastaje znanstvena teorija?

Scientific Method (1 serving)

1. Ask a question.
2. Formulate a hypothesis.
3. Perform experiment.
4. Collect data.
5. Draw conclusions.

Bake until thoroughly cooked.

Garnish with additional observations.

Too simple!

