



SIMONA CERRATO | 11 NOVEMBER 2021

SCIENTIFIC COMMUNICATION TECHNIQUES: CONTROVERSIAL ISSUES



TODAY'S SCIENCE

Science is a body of knowledge and methods that allow us to understand the universe, find our place as humans within and shape our world and societies.

**CONTEXTUALIZED / APPLIED
TRANSDISCIPLINARY
DIFFUSED
UNKNOWN
UNCERTAIN
AMBIGUOUS**

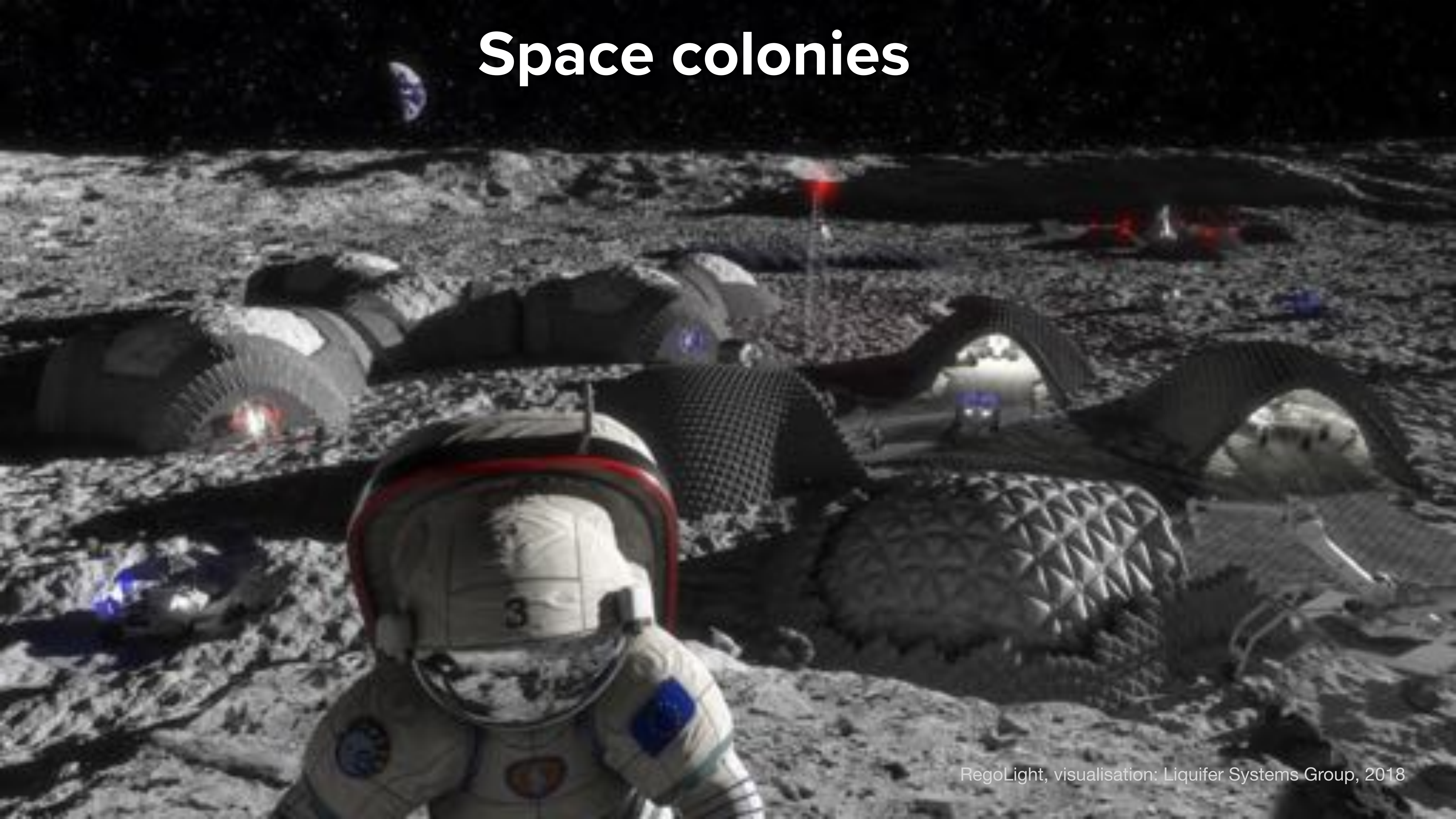
Climate emergency



Human augmentation



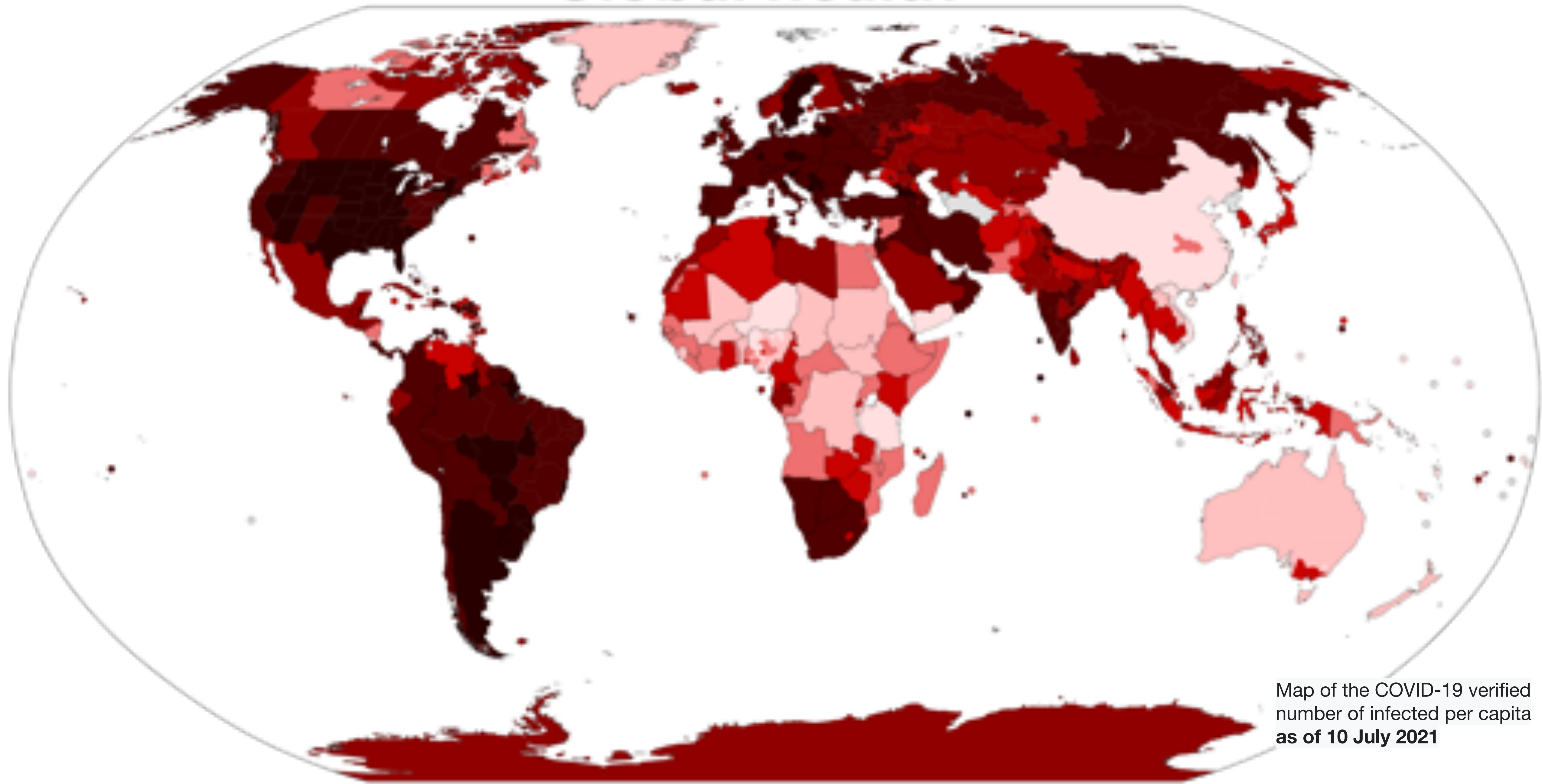
Space colonies



Artificial Intelligence

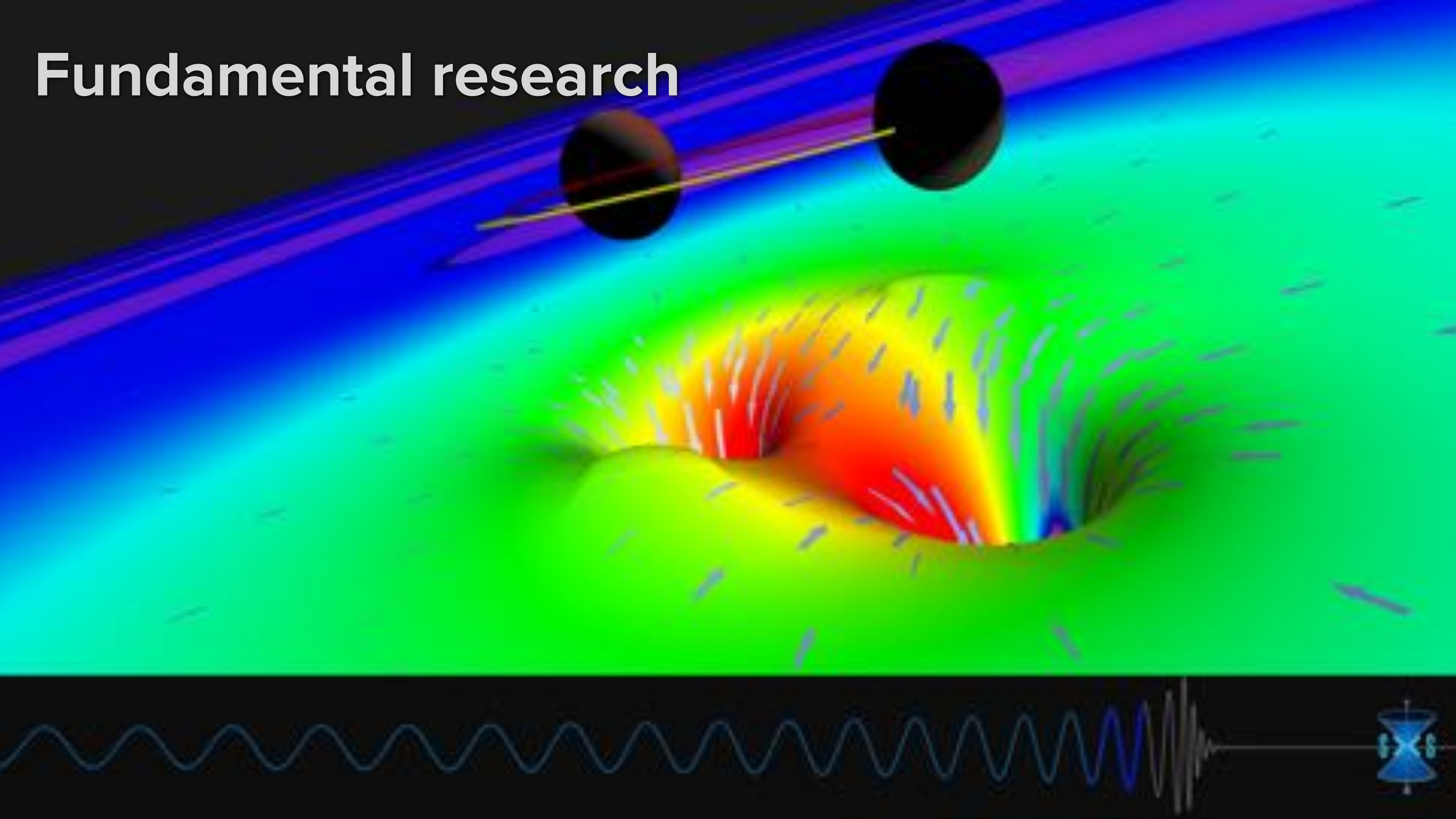


Global health



Map of the COVID-19 verified number of infected per capita as of 10 July 2021

Fundamental research



WHAT ARE CONTROVERSIAL ISSUES

THREE MAIN TYPOLOGIES

- internal the scientific community
- problems due to complexity
- scientific and technological applications

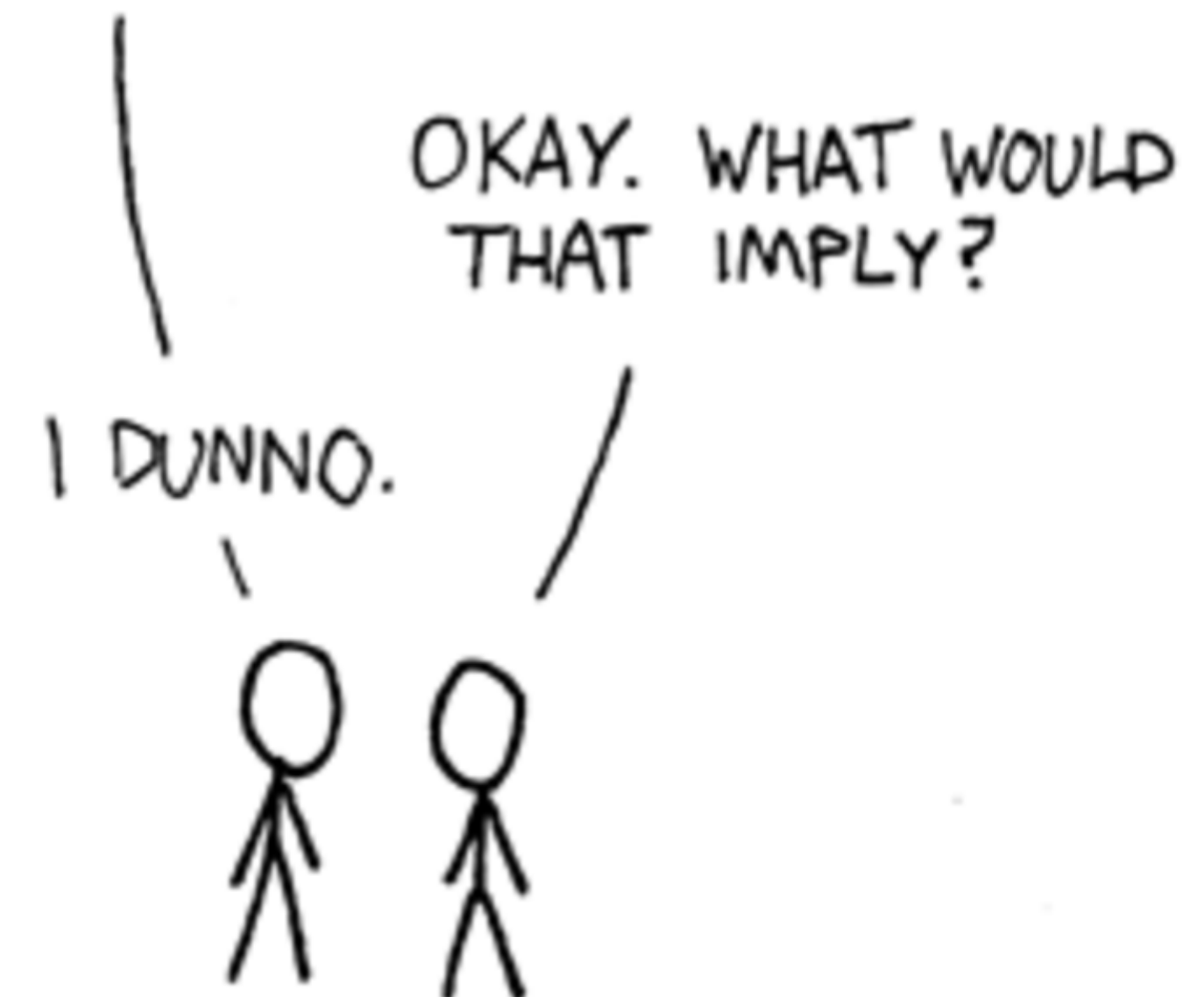
CONTROVERSIES INTERNAL THE SCIENTIFIC COMMUNITY → PRIMARY

they occur when two or more groups of researchers support different models of a phenomenon or different interpretation of a set of data

IS STRING THEORY VALID?

STRING THEORY SUMMARIZED:

I JUST HAD AN AWESOME IDEA.
SUPPOSE ALL MATTER AND ENERGY
IS MADE OF TINY, VIBRATING "STRINGS."



DO ANIMALS HAVE CONSCIOUSNESS?



ARE SLIME MOLD ABLE TO LEARN?

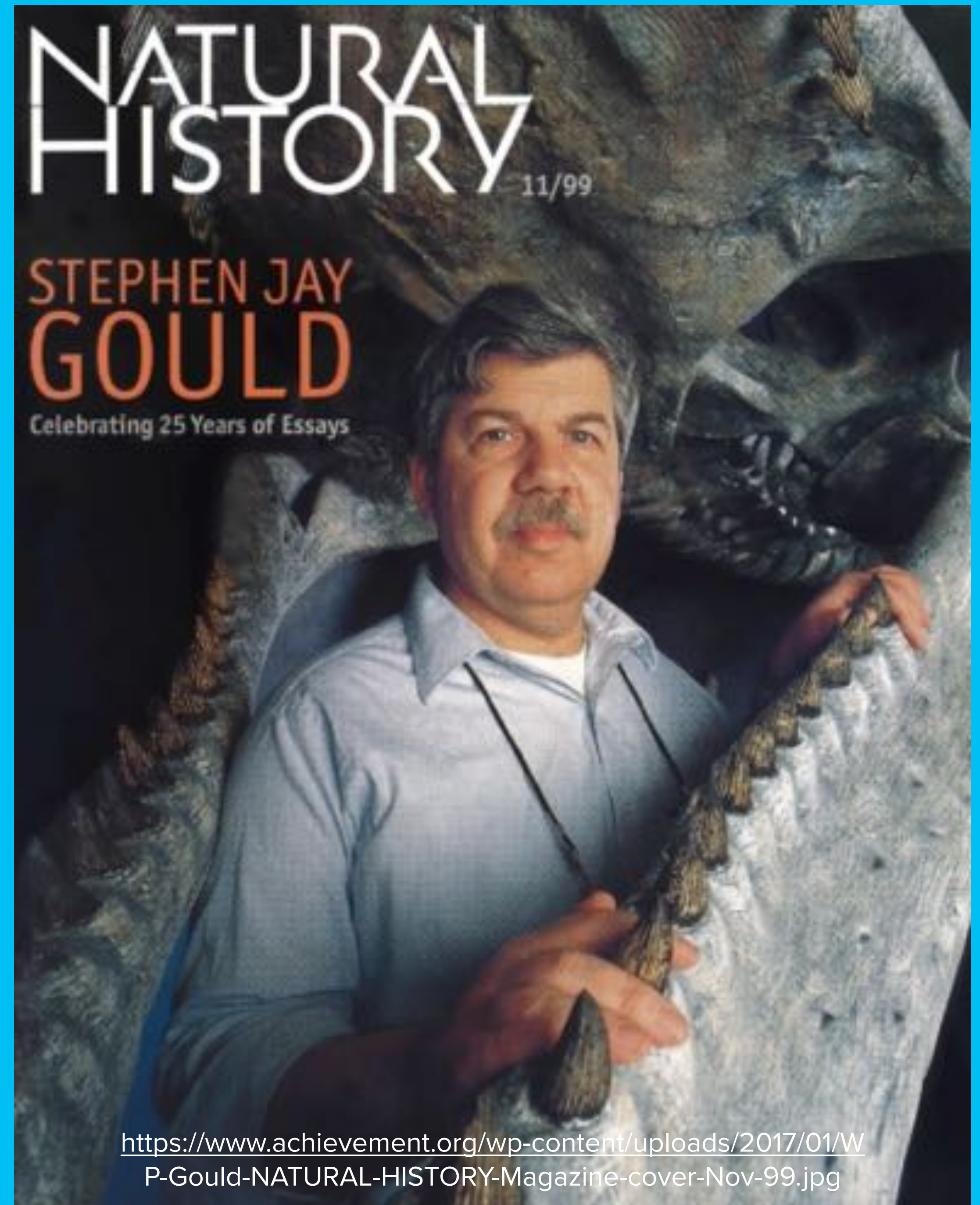


Lawrence Durell Wade, M.D.

CONTROVERSIES INTERNAL THE SCIENTIFIC COMMUNITY → SECONDARY

they occur when scientists debate on a less crucial aspect of a theory or a model which is generally accepted.

**PUNCTUATED EQUILIBRIUM
VS
PHyletic GRADUALISM
IN EVOLUTION**



BEYOND SCIENCE

PROBLEMS DUE TO COMPLEXITY

they are not easy to understand, nor are there simple solutions because of their multiple dimensions: scientific, technological, economical, sociological, etc.

HOW CAN WE MEET THE ENERGY NEEDS OF A GROWING POPULATION?



HOW CAN WE ELIMINATE PLASTIC POLLUTION?

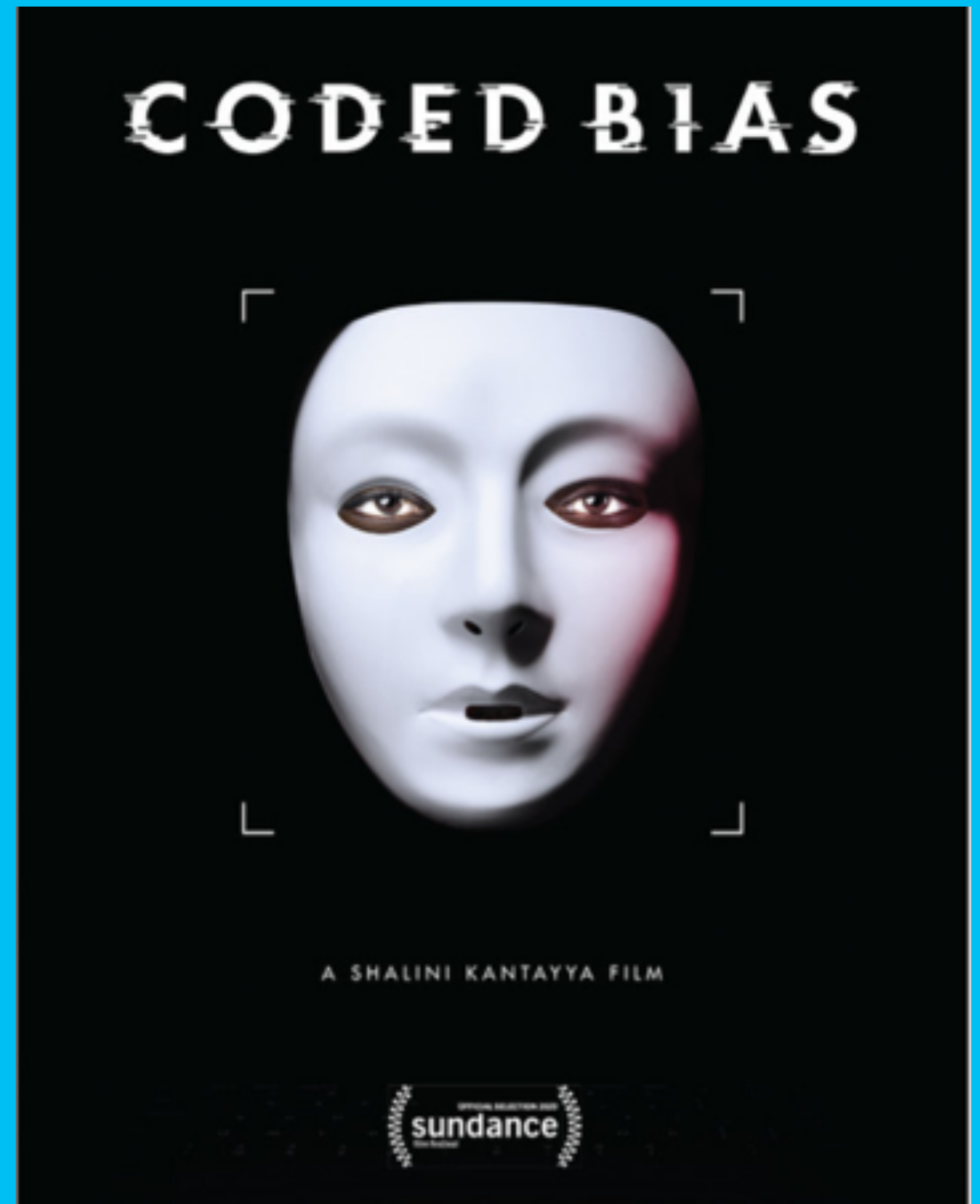


Credit: Amrit Beran

SCIENTIFIC AND TECHNOLOGICAL APPLICATIONS

they occur when the application triggers ethical, psychological, religious or economical problems. The decision regarding control and development of science applications cannot remain in the hands of the researchers: the whole society should be involved.

ARTIFICIAL INTELLIGENCE: WHAT ARE THE BOUNDARIES?



IS USING ANIMALS IN RESEARCH ACCEPTABLE?



An Experiment on a Bird in an Air Pump
by Joseph Wright of Derby, 1768. Original in the National Gallery, London

IF CITIZENS AND CIVIL SOCIETY ARE TO BECOME PARTNERS IN THE DEBATE ON SCIENCE (...) IT IS NOT ENOUGH TO KEEP THEM INFORMED. THEY MUST ALSO BE GIVEN THE OPPORTUNITY TO EXPRESS THEIR VIEWS IN THE APPROPRIATE ENTITIES.”

EUROPEAN COMMISSION

A VARIETY OF NEW TOOLS

- Citizen science
- Consensus conferences
- User panels
- Discussion games
- ...and many more

DISCUSSION GAMES



DISCUSSION GAMES ARE INNOVATIVE FORMATS WHERE PARTICIPANTS HAVE AN ACTIVE ROLE. DISCUSSION GAMES USE CARDS, HAVE SIMPLE RULES AND FIXED TIME. THE AIM IS TO DELIBERATE A COMMON RESOLUTION OR TAKE A DECISION.

WHAT ARE DISCUSSION GAMES FOR?

- **Get information**
- **Form your own opinions**
- **Discover other opinions**
- **Learn how to support your ideas**
- **Experience a model of democratic discussion**
- **Become more interested on the topic**

LET'S PLAY A GAME



DISCUSSION BASED EDUCATION

active teaching approach that focuses on learning knowledge, skills and attitudes through dialogue and controlled discussion, rather than passive approaches that focus on lecture, reading, or viewing.

TYPES OF DISCUSSION BASED EDUCATION

- trial
- role games
- discussion games

TWO PIONEERS

Deliberative Meetings Organised by Citizens

DEMOCS

- What: card game
- When: 2001
- Who: New Economics Foundation, UK
- Why: discuss on stem cells



DEMOCS FEATURES

- Freely available
- Don't require experts
- Small groups
- Large public

DEMOCS REQUIREMENTS

- **Facilitator (not expert)**
- **1 kit every 6-8 people**
- **A table for each group**
- **Time**

DEMOCS CARDS

- **Stories**
- **Information**
- **Open issues**
- **Challenges**
- **White cards**
- **Voting table**
- **Evaluation**

“ Story card ”

5

I am Peter Mills

I have been working with the World Health Organization for over 15 years. I currently work for the Global Polio Eradication Initiative (GPEI), the largest public health initiative the world has ever known. There is no cure for polio. It can cause paralysis and what some people used to call iron lung.

Most of the world is polio-free – only seven countries have cases of it. 98% of all cases are found in India, Nigeria and Pakistan.

Vaccination saves and improves lives. We have a duty to the children in these countries.



Vaccination policy

“ Story card ”

6

Hi, I'm Rachel

I've been doing research and development at a drug company in the Immunisations Department for many years.

I'm currently working on a trial vaccine for AIDS. I'm aware that some people accuse drugs companies of making huge amounts of money from people's fears for the future.

As a scientist I believe in working to develop better technology and medicine. I hope that we can make vaccines that will prevent every infectious disease. I will be proud to be a part of that.



Vaccination policy

● Information card

1

1

The introduction of MMR vaccine reduced the annual number of measles cases from 100,000 per year to very low levels.



Vaccination policy

● Information card

2

2

In the UK in 2004 80% of two-year-olds received the MMR vaccine. This is a drop from 92% in 1995.



Vaccination policy

● Information card

17

17

In October 2004, the Health Protection Agency warned that measles vaccination was so low in London that measles could spread between children, making an epidemic a possibility.



Vaccination policy

● Information card

18

18

In the last 10 years, the US National Vaccine Compensation Programme has paid over \$1 billion to vaccine damaged children.

14% of this relates to MMR or its components.




Vaccination policy

Issue card 1

?

The NHS, doctors and scientists are asking people to trust them over vaccination. But that trust has been damaged by examples like BSE (mad cow disease). Should we trust them?



Vaccination policy

Issue card 2

?

The Scotsman newspaper said: 'The government has a lamentable tendency to adopt a rigid position on an issue and then refuse to accept any change, for fear of seeming weak or inconsistent.' What are they scared of?




Vaccination policy

Issue card 7

?

Should the NHS be entitled or obliged to give parents a choice of vaccines?



Vaccination policy

Issue card 8

?

Six single vaccines leave children at risk for a longer period of time than is necessary. Should the NHS be forced to offer a service that they believe is less safe?



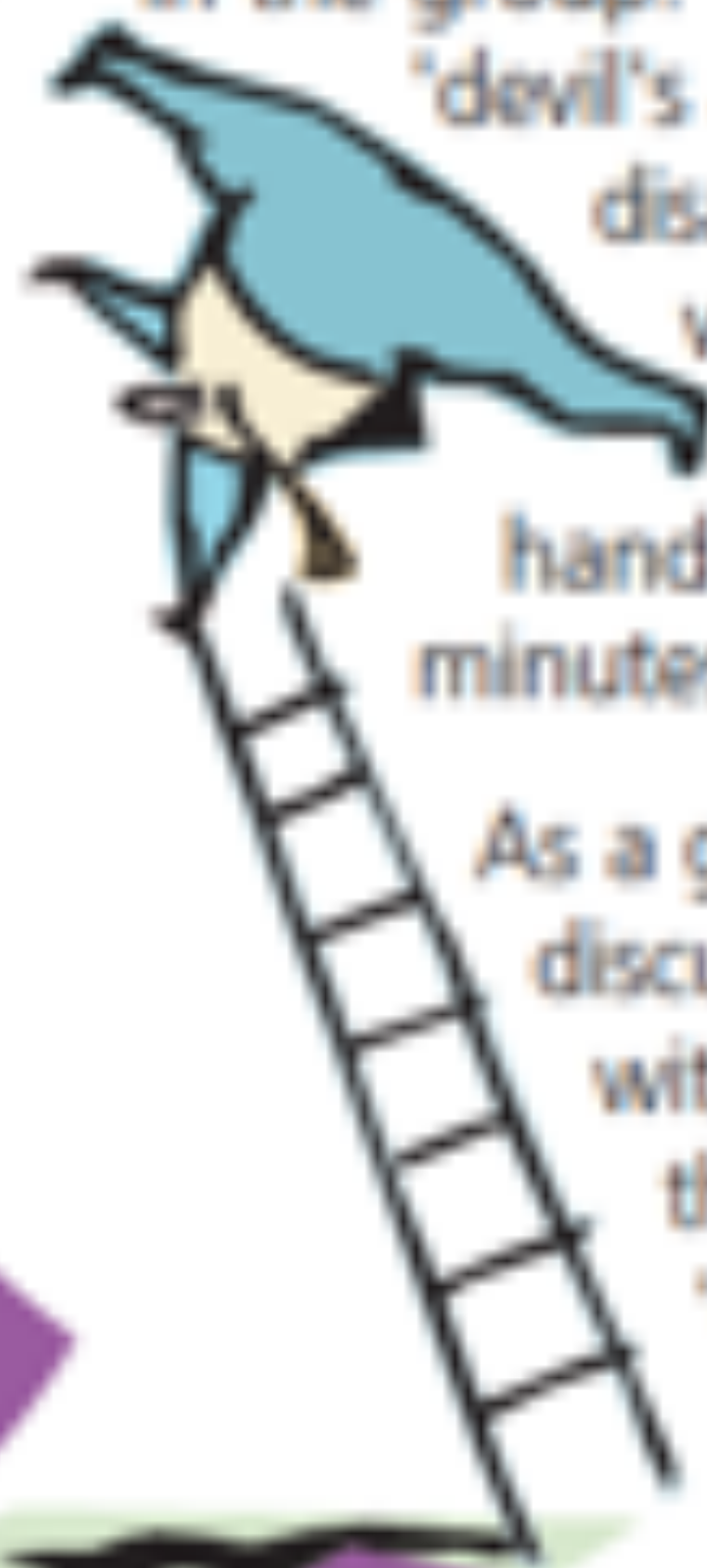
Vaccination policy



Challenge card

1

Choose one person in the group. That person is to play 'devil's advocate' and disagree with the viewpoint of the person on their left hand side for a few minutes.



As a group, have a discussion on the topic with each person stating their view, with your 'devil's advocate' in role.

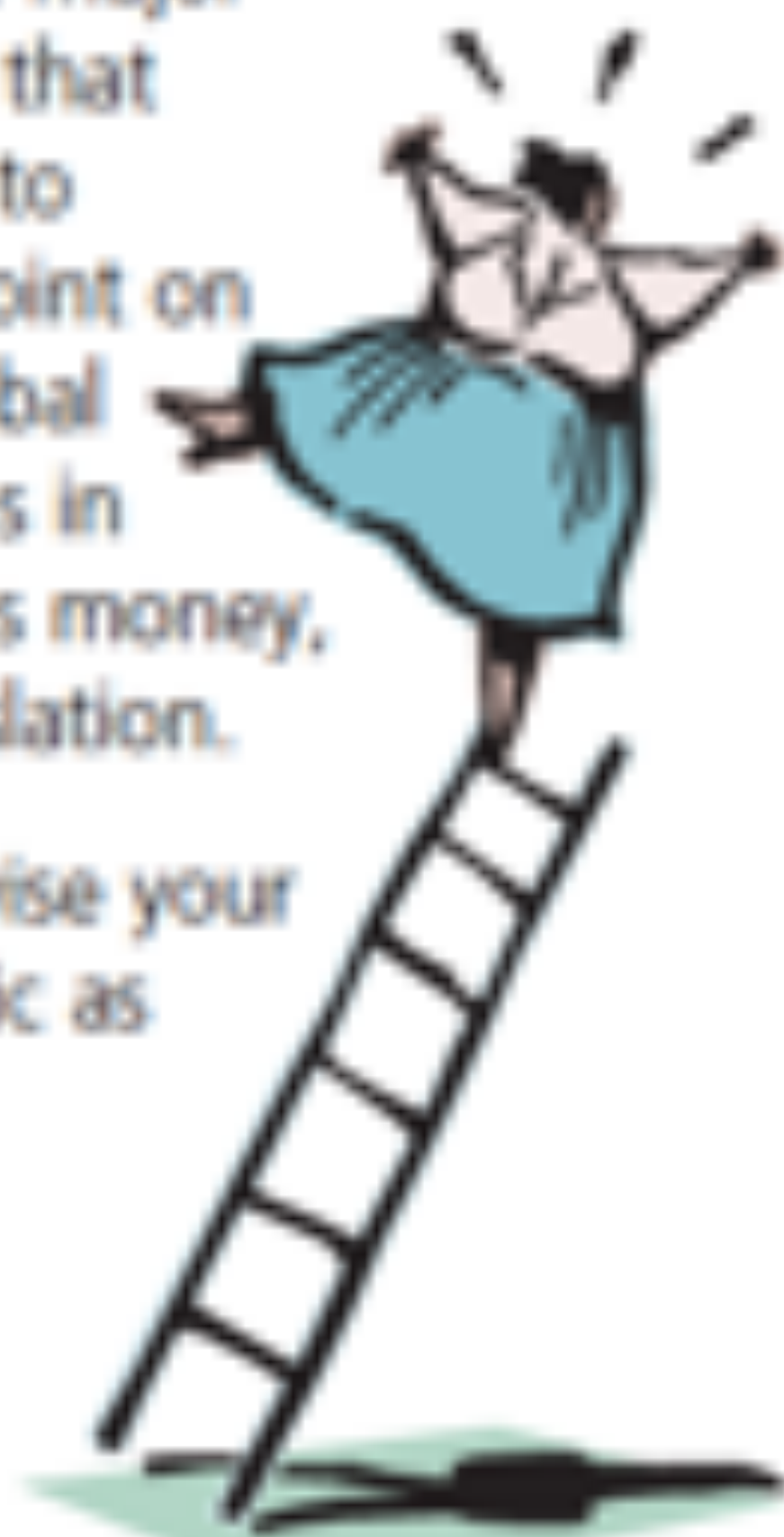


Challenge card

2

Think of one major disruptive event that would require you to change your viewpoint on this topic e.g. a global disaster, innovations in technology, limitless money, or a change in legislation.

How would you revise your opinion on this topic as a result?



Vaccination policy
voting grid

Vote after

Name _____

- 1 Vote once for each scenario.
- 2 This information will be sent to policy makers.

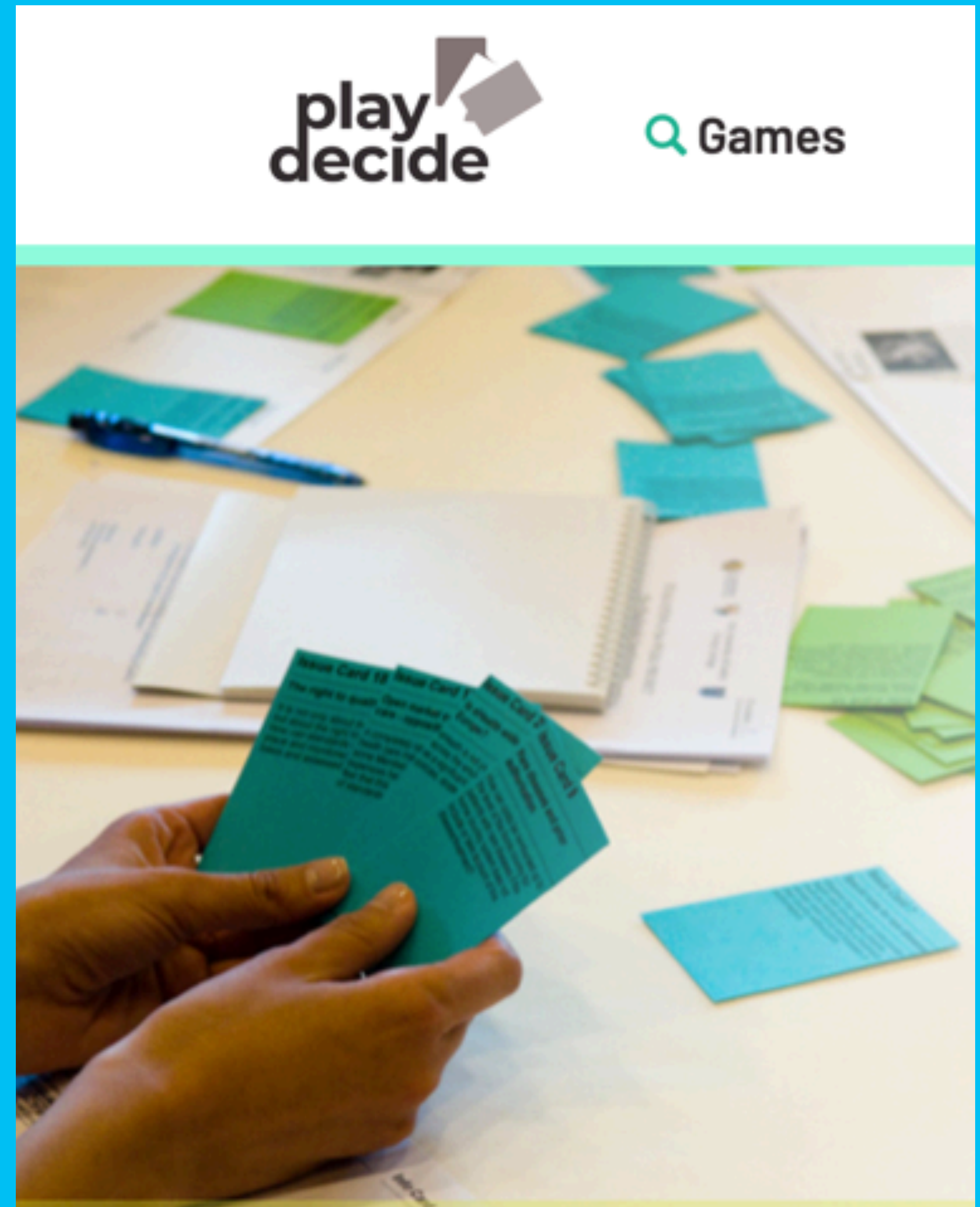
Think carefully. What is your vote?

		Agree	Not sure	Disagree
Policy position 1	No vaccination is necessary			
Policy position 2	The NHS should offer single vaccinations as alternative to MMR.			
Policy position 3	The current position is fine, with vaccination recommended but not compulsory and the NHS only offering the MMR vaccine.			
Policy position 4	All major vaccinations should be compulsory.			

PLAYDECIDE.EU

PLAYDECIDE

- What: card game
- When: 2004-2007
- Who: Decide, EU project coordinated by ECSITE ù
- Why: promote participation and awareness on complex issues



PLAY DECIDE FEATURES

- Freely available
- Don't require experts
- > 14 year
- Small groups
- Large public

PLAY DECIDE REQUIREMENTS

- Instructions or facilitator (not expert)
- 1 kit every 5-6 people
- A table for each group
- Time

PLAY DECIDE CARDS

- **Stories**
- **Information**
- **Open issues**
- **Challenges**
- **White cards**
- **Yellow card**
- **Voting table**
- **Game board**

IN SCHOOLS

DEMOCS IN SCHOOLS

- More than 1000 students
- Evaluated
- Documented

BENEFITS FOR STUDENTS

- Increased knowledge
- Ability to assess the impact
- Ability to present information
- Ability to discuss
- Ability to draw conclusions
- Interpret and criticize scientific ideas
- Increased awareness (benefits and risks)

BENEFITS FOR TEACHERS

- Ability to manage a complex discussion
- Greater flexibility and informality in the discussion
- Possibility of involving difficult or uninterested groups or students
- Inexpensive and therefore sustainable

BENEFITS IN GENERAL

- Maximize the contributions of everybody
- Allows student-centered interactions
- It is not intimidating
- It allows students to learn from each other
- It allows students to form opinions and share them
- It is creative
- It allows to develop and practice social and cooperative skills in a friendly and protected environment (accept diversity, give and receive support, cooperation etc.)
- Shift responsibility to the group
- Improve self-awareness

WORKSHOP

YOUR CONTROVERSIAL ISSUE: VACCINES

interest	educational objectives	risks and opportunities	perception	relevance (low, medium, high)
national debate	knowledge of the functioning mechanisms of vaccines	<i>risk:</i> spreading of uncontrollable fake news <i>opportunity:</i> greater awareness	very much involved a lot of confusion	high
personal and global health				