

# *Accessing Your Personal Philosophy of Science*

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This questionnaire is designed to give you some idea of your beliefs about your philosophy of science. It is adapted from Monk, M. & Dillon, J. (Eds.) (1995). *Learning to teach science: Activities for student teachers and mentors*. London: Falmer.

## Step One: Querying Your Beliefs

For each of the 24 statements below give a number representing your position ranging from 'strongly disagree' (-5) to 'strongly agree (+5) and place it next to the statement. A score of 0 indicates a balanced view.												
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
	Strongly disagree				Balanced View				Strongly Agree			

### *Questionnaire:*

<b>1</b>	<i>Your Position</i>	1. Results that pupils get from their experiments are as valid as anybody else's. (RP).
<b>2</b>	<i>Your Position</i>	2. Science is essentially a masculine subject. (CD)
<b>3</b>	<i>Your Position</i>	3. Science facts are what scientists agree they are. (CD, RP)
<b>4</b>	<i>Your Position</i>	4. The object of scientific activity is to reveal reality. (IR)
<b>5</b>	<i>Your Position</i>	5. Scientists have no idea of the outcome of an experiment before they do it. (ID)
<b>6</b>	<i>Your Position</i>	6. Scientific research is economically and politically determined. (CD)
<b>7</b>	<i>Your Position</i>	7. Science education should be more about the learning of scientific processes than the learning of scientific facts. (PC)
<b>8</b>	<i>Your Position</i>	8. The processes of science are divorced from moral and ethical considerations. (CD)
<b>9</b>	<i>Your Position</i>	9. The most valuable mark of a scientific education is what remains after the facts that have been forgotten. (PC)
<b>10</b>	<i>Your Position</i>	10. Scientific theories are valid if they work. (IR)
<b>11</b>	<i>Your Position</i>	11. Science proceeds by drawing generalizable conclusions (which later become theories) from available data. (ID)
<b>12</b>	<i>Your Position</i>	12. There is no such thing as a true scientific theory. (RP, IR)
<b>13</b>	<i>Your Position</i>	13. Human emotion plays no part in the creation of scientific knowledge. (CD)

<b>14</b>	<i>Your Position</i>	14. Scientific theories describe a real external world which is independent of human perception. (RP, IR)
<b>15</b>	<i>Your Position</i>	15. A good solid grounding in basic scientific facts and inherited scientific knowledge is essential before young scientists can go on to make discoveries of their own. (PC)
<b>16</b>	<i>Your Position</i>	16. Scientific theories have changed over time simply because experimental techniques have improved. (RP, CD)
<b>17</b>	<i>Your Position</i>	17. Scientific method is transferable from one scientific investigation to another. (PC)
<b>18</b>	<i>Your Position</i>	18. In practice, choices between competing theories are made purely on the basis of experimental results. (CD, RP)
<b>19</b>	<i>Your Position</i>	19. Scientific theories are as much a result of imagination and intuition as inference from experimental results. (ID)
<b>20</b>	<i>Your Position</i>	20. Scientific knowledge is different from other kinds of knowledge in that it has higher status. (RP)
<b>21</b>	<i>Your Position</i>	21. There are certain physical events in the universe which science can never explain. (RP, IR)
<b>22</b>	<i>Your Position</i>	22. Scientific knowledge is morally neutral - only the application of the knowledge is ethically determined. (CD)
<b>23</b>	<i>Your Position</i>	23. All scientific experiments and observations are determined by existing theories. (ID)
<b>24</b>	<i>Your Position</i>	24. Science is essentially characterized by the methods and processes it uses. (PC)

## Step Two: Producing Your Profile

An Eternal Metaphor is a question for which there are opposite answers that have been debated since the beginning of time, with no resolution. For example, is evolutionary change gradual or punctuational? Does change come from within or is it driven by external events? Stephen Jay Gould, who described this issue said, "I hope no one is prompted to ask which position is right for the answer can only be both of them, or neither." That does not stop people from believing passionately that one position is the "right" one; just look at modern politics.

In intellectual endeavors there are at least 5 axes of complementary opposites that have been endlessly debated, without resolution. They are:

- (RP): Relativism vs Positivism axis
- (ID): Inductivism vs Deductivism axis
- (CD): Contextualism vs De-Contextualism axis
- (PC): Process vs Context axis
- (IR): Instrumentalism vs Realism axis

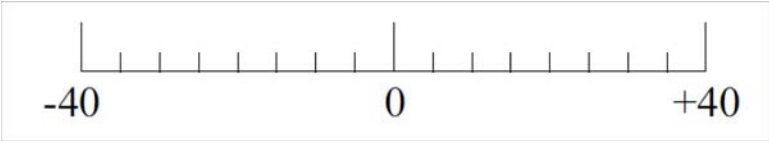
The Questionnaire you completed will help you understand your position on these axes. At the end of each question were bracketed letters indicating which axis dyad they refer to.

1. Put your score for each question in the appropriate box(es) below. (Some questions 'score' twice!).
2. Some scores have to have their sign REVERSED (i.e. multiply by (-1) before they can be used, This is indicated by a '-' next to the number, e.g., if your response to statement 1 is -3, then the score in the right-hand column on the RP boxes will be +3.0.
3. Sum your total score and mark that point on the scale lines to the right.

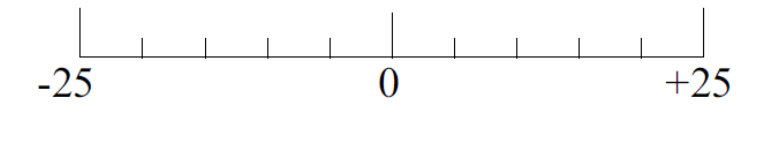
<b>Relativist-Positivist</b>		
Questionnaire		Your Agree/Disagree Position
Question Number	Score Reversal?	
1	-	
3	-	
21	-	
12	+	
14	+	
16	+	
18	+	
20	+	
Sum Your Total Score =		

<b>Inductivism-Deductivism</b>		
Questionnaire		Your Agree/Disagree Position
Question Number	Score Reversal?	
5	-	
11	-	
19	+	
23	+	
Sum Your Total Score =		

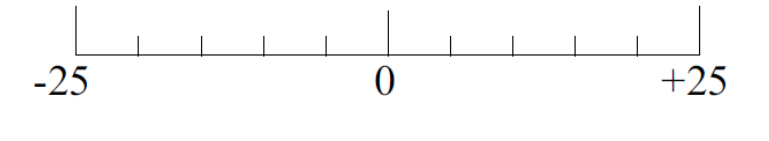
<b>Contextualism-Decontextualism</b>		
Questionnaire		Your Agree/Disagree Position
Question Number	Score Reversal?	
2	-	
3	-	
6	-	
8	-	
13	+	
16	+	
18	+	
22	+	
Sum Your Total Score =		



<b>Process Driven-Content Driven</b>		
Questionnaire		Your Agree/Disagree Position
Question Number	Score Reversal?	
7	-	
9	-	
17	-	
24	-	
15	+	
Sum Your Total Score =		



<b>Instrumentalism-Realism</b>		
Questionnaire		Your Agree/Disagree Position
Question Number	Score Reversal?	
10	-	
21	+	
4	+	
12	+	
14	+	
Sum Your Total Score =		



### Step Three: Interpreting your profile

#### ***Relativism—Positivism axis***

**Relativism:** The denial that things are true or false solely based on an independent reality. The ‘truth’ of a theory will depend upon the norms and rationality of the social group considering it as well as the experimental techniques used to test it. Judgments as to the truth of scientific theories will vary from individual to individual and from one culture to another, i.e. truth is relative and not absolute.

**Positivism:** The belief that scientific knowledge is more valid than other forms of knowledge. The laws and theories generated by experiment are our descriptions of patterns we see in a real external objective world. To the positivist, science is the primary source of truth. Positivism recognizes empirical facts and observable phenomena as the raw materials of science. The scientist’s job is to establish the objective relationships between the laws governing the facts and the observables. Positivism rejects enquiry into underlying causes and ultimate origins.

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#### ***Inductivism—Deductivism axis***

**Inductivism:** The belief that the scientist’s job is the interrogation of nature. By observing many particular instances, one is able to infer from the particular to the general and then determine the underlying laws and theories. According to inductivism scientists generalize from a set of observations to universal law, inductively. Scientific knowledge is built by induction from a secure set of observations.

**Deductivism:** The belief that scientists proceed by testing ideas produced by the logical consequences of current theories or of their bold imaginative ideas. According to deductivism (or hypothetico-deductivism), scientific reasoning consists of the forming of hypotheses which are not established by the empirical data but may be suggested by them. Science then proceeds by testing the observable consequences of these hypotheses, i.e. observations are directed or led by hypotheses—they are theory laden.

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#### ***Contextualism—De-contextualism axis***

**Contextualism:** The view that the truth of scientific knowledge and process is inter-dependent with the culture in which the scientist lives and in which it takes place.

**De-contextualism:** The view that scientific knowledge is independent of its culture location and sociological structure.

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#### ***Process—Context axis***

**Process driven:** Science is seen as a characteristic set of identifiable methods/processes. The learning of these is the essential part of science education.

**Content driven:** Science is characterized by the facts and ideas it has and that the essential part of science is the acquisition and mastery of this body of knowledge.

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#### ***Instrumentalism—Realism axis***

**Instrumentalism:** Scientific ideas are fine if they work, that is they allow correct predictions to be made. They are instruments that we can use but they say nothing about an independent reality or their own truth.

**Realism:** The belief that scientific theories are statements about a world that exists in space and time independent of the scientist’s perceptions. Correct theories describe things which are really there, independent of the scientists, e.g. atoms.